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BY W. NEWTON,

CIVIL ENGINEER AND MECHANICAL DRAFTSMAN.

(Assisted by several Scientific Gentlemen.)

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III. Bailey's Stocking Frame, and Young's Improved Hinges.

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V. Berry's Apparatus for marking down Notes; Smith's Improved Chisel; Cook's Bedstead; Robson's Signal Light; Hale's Propelling Apparatus; Smith's Propeller; Walker's Improved Extinguisher; and Fussell's Pump.

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CONJOINED SERIES.

No. LXVII.

Recent Patents.

To JAMES DREDGE, *of the parish of Walcot, in the city of Bath, and county of Somerset, brewer, for his invention of certain improvements in the construction of suspension chains for bridges, viaducts, aqueducts, and other purposes, and in the construction of such bridges, viaducts, or aqueducts.*—[Sealed 17th June, 1836.]

THESE improvements in the construction of suspension chains for bridges and other erections to be supported on the principles of suspension, and in the construction of such bridges and other suspended erections, have for their object, first, a means of affording greater strength and stability than has been obtained by any of the varied constructions of suspension bridges, piers, or other erections of that kind, which have been heretofore formed of corresponding magnitude and ex-

tent; and, secondly, the economy of materials and labour required to be expended in such erections.

These objects are effected in the first instance, by so arranging and connecting a series of parallel links to constitute the chains, that the chain may diminish in breadth, and, consequently, in weight, as it recedes from the point or points of suspension; secondly, in applying such chains to the purposes of constructing suspension bridges and other similar erections, in connexion with inclined suspension rods or bars instead of the usual perpendicular suspension rods or bars, by means of which I am enabled so to connect the longitudinal bearings of the horizontal platform or roadway to the hanging chains, that the weight or principal leverage of the erection may be removed from the centre, and be sustained by the stronger parts of the chains increasing towards the abutments; thirdly, in the employment of transverse tie-beams of a peculiar construction for confining the longitudinal bearings of the horizontal platform or roadway; and, fourthly, the adaptation of a ball and socket bearing to the inclined suspension bars or rods, by means of which, the level or proper position of the platform may be readily adjusted.

In Plate I., fig. 1, represents, upon a large scale, a portion of chains formed by sets of links placed side by side in parallel series *a, a, a, a, a, a*; *b, b, b, b, b*; *c, c, c, c*; &c., connected together by transverse bolts *z, z, z*, the links of each of which series diminish in number as they recede from the piers or points of suspension. Fig. 2, represents a side elevation of a suspension bridge constructed with chains of this description, and inclined suspension rods or bars *m, m, m*;

fig. 3, is a plan or horizontal view of the same; and fig. 4, is a transverse section taken through the bridge in a vertical direction. Fig. 5, represents a portion of one of the suspension rods *m*, showing its lower end, with the ball and socket bearing *o*, having a screw-nut *p*, for the purpose of adjustment. The ball bears against a recess or socket formed in the under part of the saddle piece *q*, through which the longitudinal bars *r*, *r*, pass that support the platform; fig. 6, is another representation of the same, taken transversely; *s*, is a part of one of the transverse tie-beams, which it will be seen by fig. 4, is bowed upwards; and *t*, is the string or tension rod, which confines it. The means by which the transverse tie-beams *s*, and their tension rods *t*, are connected to the saddle pieces *q*, that the lateral longitudinal bars *r*, pass through, will be seen by reference to the figs. 5, and 6, and require no further explanation. They are intended to confine the longitudinal bars and to prevent the structure from vibrating in lateral directions, while the peculiar manner in which the suspending rods *m*, *m*, are applied, will prevent vibrations in vertical directions. On the top of the tie-beams, the planking *u*, *u*, is placed, for the reception of the roadway *v*.

"I would here remark, that if it is thought desirable, two or more inclined suspension rods may diverge from each link of the chain to different parts of the platform, instead of only one, as shown in the drawings; and, that they may be attached thereto in any convenient manner.

"Lastly, I desire it to be understood, that I do not intend to confine myself to any particular dimensions of the parts of which the suspended erection shall be formed, nor of the particular number of the links to be

connected in each parallel series, nor to any particular angle from the perpendicular, at which the suspending rods shall be placed; but, that which I do claim as my invention, is the construction of a chain to be applied to the purposes of suspension, which shall diminish in breadth and weight as it recedes from the point or points of suspension; also the construction of a bridge or other suspended erection by means of such chains, in connexion with inclined suspension rods, supporting the platform or horizontal part of such erection; likewise the manner of bracing the parts together by transverse bow and string tie-beams, and the mode of adjustment by the ball and socket connexions."—[*Inrolled in the Rolls Chapel Office, December,* 1836.]

Specification drawn by Messrs. Newton and Berry.

To JOHN CHANTER, *of Stamford-street, Blackfriars, in the county of Surrey, gentleman, and* WILLIAM WITTY, *of Basford Cottage, near Newcastle, in the county of Stafford, engineer, for their invention of an improved method or improved methods of abstracting heat from steam or other vapours and fluids, applicable to stills, breweries, and other useful purposes.*—[Sealed 26th July, 1834.]

THIS is a refrigerating apparatus for condensing vapours or cooling worts, consisting of a series of narrow chambers or vessels, through which a current of cold water is made to flow; and between these vessels or chambers the vapour to be condensed or the liquor to be cooled is made to pass in an opposite direction.

It will, from this slight description, be immediately

perceived that the principles on which this apparatus is founded, are the same as those of many other refrigerators that have preceded it; whatever novelty, therefore, this suggested improvement may present, must be looked for in the form of the apparatus alone.

Plate I., fig. 7, represents a section of the refrigerating apparatus, consisting of a series of very thin or narrow vessels or chambers of rectangular shapes, as seen at *a, a,* formed by thin plates of tinned copper, rivetted together. These vessels are placed side by side at the distance of about a quarter of an inch apart, and are kept from actual contact by small round studs.

The series of vessels are mounted in a wooden vat *b, b,* having a false bottom, and at the back part there are a series of flat pipes *b,* which severally communicate with the interiors of the respective vessels at their lower parts. These pipes are supplied with cold water from the cistern *c,* which water flows through the vessels *a,* in the direction of the arrow, and passes off at top by a tube *d,* into the chamber *e,* whence it flows away by a waste pipe.

The vapour to be condensed or liquor to be cooled is admitted into the apparatus by a pipe leading into the chamber *f,* and from thence it flows downwards through the spaces between the several chambers *a,* and discharges itself through the false bottom into the chamber *g,* and proceeds by the pipe *h,* into a receiving vessel.

A modification of this contrivance is proposed, consisting of a series of cylindrical tubes fixed in a frame, each having a lesser tube within it. The cold water is made to pass upwards through the spaces between the outer and inner tubes, and the vapour or wort to pass downwards through the internal tubes, thereby causing the hot liquor or vapour to transfer its heat to the cold water, which is discharged at a temperature nearly

equal to that of the liquor or vapour when it enters the apparatus.

These contrivances are proposed, firstly, for condensing the spirituous vapours emitted from distillation; secondly, for cooling brewer's worts and distiller's wash, or other liquors; and, thirdly, for condensing the eduction steam of an engine. The principal advantage that appears to be proposed by the Patentees, is the facility of separating the parts of the apparatus for cleaning and repairs.

A refrigerator, constructed with extended narrow passages between thin plates, in which the cold water flows in one direction, and the hot vapour or liquor in the opposite direction, formed the subject of a patent granted to James Yandal, in August, 1826; (see the thirteenth volume of our First Series, p. 65;) and a condenser constructed of tubes, through which steam or other vapours passed in one direction, while cold water passed in the opposite direction, for the purpose of condensing the former, and thereby heating the latter, constituted part of a patent granted to Dr. Church, September, 1833. (See our present Conjoined Series, vol. iv. p. 233.)—[*Inrolled in the Inrolment Office, January*, 1835.]

To Thomas Ellis, *of Stamford-hill, in the county of Middlesex, Esq., and* Thomas Burr, *of Shrewsbury, in the county of Salop, plumber, for their invention of improvements in the manufacture of sheets and pipes, or tubes, and other articles of lead and other metal.*—[Sealed 24th November, 1826.]

This invention consists of improvements in that mode of manufacturing tubes, for which a patent was for-

merly granted by his late Majesty, Geo. IV., to Mr. Thomas Burr, bearing date the 11th day of April, 1820, (see London Journal of Arts, vol. i. First Series, p. 411,) according to which invention, lead was pressed out of a cylinder through dies, called washers or thimbles, having an internal die or core.

Now, the object of the present improvements consists, first, in applying a certain elongation to such cylinder from which the lead is forced, whereby the Patentees are, by the aid of wedges, enabled more securely to hold and adjust the dies used in making the pipes or tubes; and which, for performing one part of their invention, are cut open longitudinally in the act of making, and thus produce sheets of lead. Secondly, the invention consists in a mode of applying a coating or covering of tin, or a compound of tin and alloys, to the internal and external surfaces of a lead tube, or pipe, or other articles produced by forcing lead through dies, simultaneously with the formation of the pipe or tube itself, or of the making of the other articles, depending on the shape or form of the dies put into the machine; and, thirdly, in the application of a conical or inclined surface, and a suitable cutting instrument to the apparatus for making pipes or tubes, in order (in the act of forming the same) that they may be laid out and flattened into sheets, as hereafter described.

Plate II., fig. 1, represents a section of the machinery used for making lead into pipes or tubes, whether it be laid open into sheets or otherwise, or to be coated internally or externally, or both, with tin or a compound of tin: *a, a,* is a strong hollow cylinder of cast iron, which is similar to the cylinder used under the former patent; but, in the present cylinder, the upper part *b, b,* is added, there being suitable openings formed therein

in order to have the wedges *c*, *c*, passed through, they having inclined surfaces at their inner ends, resting on the upper part of the die *d*, (the construction of which is clearly shown in the drawing), by which means the die *d*, is securely held in its place; in addition to which, the die can be most accurately adjusted by driving the wedges with care, first one and then the other; *e*, is a smooth steel or other suitable rod affixed to the piston *f*, the rod *e*, serving as the internal core for forming the inner surface of the pipe, or tube, as the metal is forced out through the die *d*. The piston *f*, is fitted to slide freely, yet closely in the cylinder *a*, *a*, and is affixed to the upper end of the plunger or piston of an hydraulic press; *g*, is a hole drilled or formed in the side of the cylinder *a*, in which lead is kept; and *h*, is another hole drilled or formed in the cylinder *a*, *a*, in which tin, or a compound of tin are placed; and the cylinder *a*, *a*, is kept heated by a flue or jacket passing round it, to such a degree as will keep the tin well melted; but should the lead in the other hole melt, the workman must damp off or lower the heat.

The drawing represents the machinery arranged for making lead pipes or tubes of an inch diameter, which, in the act of making, are coated internally and externally with tin, or a compound thereof. The workman first pours melted lead into the cylinder *a*, *a*, through the die *d*, or through a hole made in the upper end of the cylinder, which hole is afterwards stopped by a plug or screw, the piston being at the lower end of that cylinder to admit thereof; and the same is permitted to set before the pump of the hydraulic press is put to work. A quantity of tin is placed on the die *d*, and, as the cylinder *a*, and the die *d*, are kept to a sufficient degree of temperature at all times, the tin will remain in a fluid

state. On the pump of the hydraulic press being worked, the piston of the press will slowly rise in the cylinder *a, a,* pressing out the lead therefrom in the form of a tube or pipe, which coming in contact with the fluid tin, will be coated on the inside and outside, the workman supplying a quantity of tin on the inside of the tube or pipe as soon as it rises a few inches above the die *d.*

It will be evident, from the above description, that in case lead pipes uncombined with tin are desired, the tin or coating compound of tin is to be omitted; and in case it is desired to make sheets, by laying open the pipe or tube produced as above, an apparatus, fig. 2, is to be used, it being intended to open the pipe to such an extent as will allow of the same being readily rolled up as if it were a flat sheet; *g*, is a cone securely fixed over the die *d*, so as to allow of the core coming up to it at the completion of its movement in the rising of the piston in the cylinder *a, a.*

On the cone *g*, or at other convenient position, is affixed a cutting edge against which the pipe or tube coming as it is forced upwards in the act of forming, it is cut, and by the cone is laid open to such an extent as to be sufficient for the purpose of being rolled up as if it were a flat sheet.

The other figure of the drawing shows another die, which may be used for producing other articles to be coated with tin in the act of making.

"Having thus described the nature of our invention, we would have it understood that we lay no claim to those parts which were formerly used and described in the said Thomas Burr's said specification to his former patent; but what we do claim is, first, the application of the elongation *b*, of the cylinder *a, a*, for receiving the wedges *c, c*, for forming sheets, and pipes or tubes, and

other articles of lead and other metal as above described; secondly, we claim the mode of coating the inner and outer surfaces of lead pipes or tubes, and other articles, with tin or compounds thereof, when in the act of making such tubes or pipes, and other articles, by the description of machinery herein described; but we do not claim coating of lead pipes or other articles with tin by a subsequent process, that having been before accomplished by other means; and, thirdly, we claim the application to such description of machinery, suitable surfaces and cutting instruments for laying the pipes or tubes longitudinally, and for making sheet lead therefrom in the act of making tubes or pipes; but we do not claim generally the using of a cutting edge to such machinery, we having before used a cutting edge in combination with such machinery for marking the tubes longitudinally, in order to their being subsequently cut open for open pipes.—[*Inrolled in the Inrolment Office, May,* 1837.]

To WILLIAM HANCOCK, *of Windsor-place, City-road, in the county of Middlesex, gentleman, for his invention of certain improvements in bookbinding.*—[Sealed 7th December, 1836.]

THESE improvements in bookbinding consist in attaching the leaves of books at their backs by means of caoutchouc or Indian rubber in a fluid state, or in a thin sheet.

The leaves of the books to be bound, after being folded, and beaten or pressed, and placed in their proper positions, instead of being notched and sown at the back, as usual, are to be fixed in the ordinary cutting

press, and the backs or folds of the leaves cut away by means of the ordinary cutting knife. These cut edges are then rendered slightly rough by scraping, or by any rough tool, as a fine grooved plane; and when that has been done, two coats of a thick solution of caoutchouc is put upon the back of the leaves, which cements their edges securely together.

Upon this may be placed a thin sheet of caoutchouc, or a strip of silk, linen, cotton, or other suitable material, coated with a solution of caoutchouc, and pressed close by the hand; and when dry, the edges of the leaves will be found to adhere much more securely than when sewn in the old way, and will open with a degree of elasticity never before effected by any other means.

Instead of cutting away the whole of the backs of the leaves of the book, broad grooves only may be cut slight depths in the back in several places, and strips of thin caoutchouc, or silk, linen, cotton, or other suitable material, coated with caoutchouc, may be placed in those grooves, and made fast by the thick solution, moistened by spirits of turpentine, which will hold the leaves securely.

A coating of caoutchouc, either in solution or in a sheet, may be added to the back of a book after it has been sown, instead of paste or glue, which will very much improve its security, and afford elasticity in opening.

When the leaves have been thus secured at their back parts, the books may be bound in boards in the ordinary way, and be otherwise covered and decorated in the usual manner.

The Patentee says, in conclusion, that he does not claim exclusively the use of Indian rubber for binding books, but he claims its application in the way above described for securing the leaves.—[*Inrolled in the Inrolment Office, June,* 1837.]

To Alexander Ritchie, *of Leeds, in the county of York, merchant, for a certain improvement in dressing and finishing woollen cloths and other woven fabrics, being a communication from a foreigner residing abroad.* —[Sealed 13th June, 1836.]

These improvements, in dressing and finishing woollen cloths and other woven fabrics, consist in the employment of a hollow perforated steam cylinder or cylinders, or other vessel or vessels of approximate figures, by means of which a multitude of small jets of steam may be introduced into tightly rolled or closely compacted thicknesses of woollen cloths, for the purpose of producing upon such cloths effects equivalent to the operation technically called "*roll boiling.*" As there are obviously many modes or constructions of machinery by which these hollow perforated vessels may be made to emit jets of steam into closely compacted or tightly rolled thicknesses of cloth, I shall consider it sufficient to show one practical method of applying them to that purpose, in connexion with a gig-mill or brushing machine.

In Plate II., fig. 5, is a front elevation of a gig-mill, with two hollow perforated steam cylinders connected therewith, and the other necessary appendages by which they are adapted to perform the steaming operation. Fig. 6, is an end elevation of the same. Cast iron end standards *a, a, a, a,* braced together by longitudinal bars or rods, support the machinery. The gig barrel *b, b,* covered in the ordinary way, with teasels, or cards, or brushes, is mounted upon an axle, and made to revolve by a band (from the steam-engine or other first mover) passed round the pulley *c.*

The hollow steam cylinders *d, d,* placed one above the gig barrel, the other below it, turn with their hollow

gudgeons in plummer boxes, mounted on the end standards. They are, in preference, made of sheet copper of suitable thicknesses, and have each a multitude of small holes perforated through, from the periphery to the interior, for the discharge of the steam. To the extremity of the hollow gudgeon of each hollow cylinder, a pipe *e*, *e*, is attached, with suitable steam-tight joints and packing, for the conveyance of steam from a boiler placed at any convenient distance; and, to the corresponding gudgeons at the reverse ends of these hollow cylinders, similar pipes *f*, *f*, are in like manner connected, for the conveyance of cold water into those cylinders when required to cool the cloth under operation. Of course, it will be understood that the steam and water pipes must have stop cocks to let on or shut off the steam and the water, as may be necessary in the course of the operation.

The machinery by which the steam cylinders are occasionally made to revolve, being nearly the same as that usually applied to the wooden winding rollers of an ordinary gig-mill, it is not necessary to describe it particularly, but merely to say that a pinion *g*, on the end of the axle of the gig barrel, taking into the toothed wheel *h*, causes, by its rotation, the whole train of wheels *h*, *i*, *k*, and *l*, to revolve. The wheel *k*, slides loosely upon the gudgeon of the lower hollow cylinder, and the wheel *l*, upon that of the upper hollow cylinder; one of which wheels, as occasion may require, is to be locked by means of a clutch *m*, to the gudgeon, for the purpose of giving rotary motion to its cylinder, in order to wind or roll on the cloth; whilst the other cylinder being released by the withdrawal of the clutch, turns freely, and allows the roll of cloth to be unwound and drawn off. For the purpose of giving such tension

to the cloth as shall cause it to be wound tightly upon the taking up or lapping cylinder, a friction break *n, n*, with a weighted lever *o, o*, is applied to the periphery of a pulley *p, p*, fixed upon the gudgeon of each of the hollow cylinders, which friction break, when brought into operation upon the pulley of the delivering cylinder, will necessarily produce such retardation of the unwinding roll of cloth, as will cause the taking up roller to draw the cloth with considerable tension, and wind or lap it on tightly. This effect is also further aided by a pressing roller *q, q*, acting against the surface of the cloth rolled upon the periphery of the hollow cylinder; the pivots of which roller turn in levers *r, r*, hanging upon fulcrum pins fixed in the end standards or framework; and weights *s, s, s, s*, are suspended from the longer arms of these levers for the purpose of increasing the effect of the pressing roller against the cloth winding upon the cylinder.

"Having now given a general description of a machine in which these hollow perforated steam vessels may be advantageously employed for the dressing of cloth, I proceed to explain the process or manner of conducting the operation in connexion with the machine above exhibited.

Before the woollen cloth intended to be submitted to the process is wound upon the cylinders, about twenty yards, more or less, at discretion, of cotton or linen cloth should be wound tight around the cylinders, in order to prevent the cloth intended to be operated upon from being too much heated by coming into immediate contact with the cylinders, and to cause the steam, after passing through the holes in the cylinders, to spread, so as to operate uniformly upon the cloth rolled thereon. The process to be performed upon the cloth may, in

general, be applied with the best advantage, immediately after the pile or nap has been raised by the gig-mill, and before the process of shearing; but it may be performed with nearly the same effect after the pile of the cloth has been partially cropped or shorn, and particularly where the threads of the cloth are very fine. One end of the piece of woollen cloth to be operated upon, is to be attached to one end of the piece of cotton or linen cloth, wound on one of the hollow perforated cylinders, and the other end of the piece of woollen cloth attached to the end of the other piece of cotton or linen cloth wound on the other perforated cylinder.

Before the steam is thrown into the cylinders, the woollen cloth to be operated upon, together with all the cotton or linen cloth attached to it, should be wound very tightly around the cylinder into which the steam is to be introduced, the cloth being wet and the pile raised.

Now, let steam be admitted into the cylinder upon which the cloth is wound, in order that it may pass from the cavity inside of the cylinder through the perforated holes into the cloth; and whilst the cloth is thus wound tight upon the cylinder, continue the operation of the steam for the space of from ten to twenty minutes, more or less, according to the pressure of the steam, which may be from twelve to forty pounds on the inch, more or less, at discretion. After this has been done, let the cloth be wound off from this cylinder on to the other cylinder; and while it is winding, let it be wetted again with water in the way that cloth is usually wetted when upon the gig-mill.

The cloth, in thus passing from one cylinder to the other, is to be operated upon by the teasels of the gig barrel preparatory to winding it tightly, with the cotton or linen cloth, attached to it, upon the other cylinder,

into which the steam has not yet been admitted. When the whole of the cloth has been tightly wound on the other cylinder, let the steam be admitted into that cylinder in the same way as it has before been admitted into the other cylinder, for a like length of time; and, after this, let the cloth be wound off, as before, from this cylinder upon the other cylinder; and while it is winding, let it be wetted and operated upon by the teasels of the gig barrel, as before; it may then be taken from the cylinders, the process having been completed. These operations, however, may be performed with only one cylinder, and a common cloth roller, in the place of the two cylinders, as shown; but two cylinders are preferable, as the operations can be performed thereby in less time, and each end of the cloth in its turn be brought nearest to the steam cylinder, which will cause the cloth to be more uniformly operated upon.

In the operations of loosening, straightening, and laying the nap, stiff brushes, or metallic points, may be used instead of teasels, but teasels are much to be preferred to either.

The operation may be performed by forcing the steam through the cloth, but once instead of twice, by continuing this part of the process for about twice the length of time; or the operation may be performed by forcing the steam through the cloth three or more times, limiting the duration of each operation to the proportionate shorter period; but the method of operating above described is deemed preferable.

The object and purpose of applying steam through such hollow perforated metallic cylinders or vessels, to cloth wound tightly upon them in the way and manner described, is to aid in straightening and laying the nap of the cloth, and to give it a smoothness, softness, and gloss on the surface, which can be better effected, and

in a much shorter time by the means above set out, than by any other methods or process heretofore in use.—[*Inrolled in the Rolls Chapel Office, December*, 1836.]

Specification drawn by Messrs. Newton and Berry.

To John Burns Smith, *of Salford, in the county of Lancaster, spinner, and* John Smith, *of Halifax, in the county of York, dyer, for their invention of a certain method or methods of tentering, stretching, or keeping out cloth to its width, made either of cotton, silk, wool, or any other fibrous substances, by machinery.*—[Sealed 10th August, 1836.]

This improved method of tentering, stretching, or keeping out cloth to its width, made either of cotton, silk, wool, or any other fibrous substance, by machinery, consists, firstly, in a peculiar construction and arrangement of those parts or pieces of the apparatus which are to be brought immediately into connexion with the selvages of the cloth, and which are intended to carry the system of fine points, or tenters, for holding out the cloth; and, secondly, in the novel manner of guiding or conducting such series of points or needles, in order that they may be made to enter the cloth with ease, and allow the same to be stretched by the agency of other parts of the machinery particularly intended for that purpose. It will be remembered that most cloths, or other woven fabrics, are subject to shrinking or contraction in the width of the piece when submitted to the necessary operations of bleaching, dyeing, stiffening, or other wetting process, and that, consequently, in order to regain the original, or any desired width of the piece of goods that has become so shrunk or con-

tracted, it is necessary to submit it to the process of stretching or tentering, and then drying it in the stretched or extended state.

To effect this stretching operation of the fabric while drying, our improved machinery is designed and is capable of facilitating and accomplishing the same in a more perfect manner than by any of the methods which are usually adopted. In order that this our improvement may be more perfectly explained and better understood, as well as for the convenience of showing such parts or pieces in connexion in their operating situations, with respect to the other parts of the machinery, we have thought it advisable to exhibit in the drawings, representations of our improved stretching machinery complete, as well as in the several detached views of our improved parts in detail.

Fig. 4, Plate II., represents a sectional elevation, taken longitudinally, through the middle of the machine; and underneath this figure the furnace is shown, with the necessary flues for heating the air chamber, with which the machinery is connected, for the purpose of drying the goods while under operation.

The principal framing of the machine is composed of iron plates, which are rivetted, or otherwise fastened together, in such suitable pieces as shall form the bottom and sides of the machine; and it is then to be covered with a series of plates to constitute the top, and to render the whole a moderately air-tight chamber, capable of retaining the greater portion of the heat with which it is intended to be charged, by means of the furnace, or by a continuous supply of hot water or steam conducted through it in pipes, or by any other manner that may be preferred. This chamber, or casing of the machinery, is shown at *a, a, a, a,* and there are

four rotary shafts, *b, b, b, b,* placed across the machine at suitable distances apart, having right and left handed screws cut upon them; both ends of those shafts bear upon suitable pedestals, bolted to the outside of the framing of the machine, and the boxes or nuts in which these screws act, are let in and securely fastened to the two grooved rails or cheeks *c, c, c, c.* These threaded shafts are for the purpose of adjusting the distances of the rows or series of pins or points sliding in the rails *c, c, c,* upon which the piece of cloth, or other fabric under operation, is to be held, as will be hereafter more particularly described. There are also six transverse rails, having V or upper angular edges formed upon them, for the purpose of bearing or supporting the grooved rails *c, c, c.* These grooved rails are formed on the upper edges of frames, applied in parallel ranges in one part, but slightly inclined at the other part. The groove in each is for conducting and supporting the tenter pieces *d, d, d, d,* which carry the pins or points *e, e, e, e.*

Fig. 5, is a horizontal or top view of one of the tenter pieces *d.* Fig. 6, a front elevation of the same, having also a transverse section of one of the grooved rails on the top edge of the frame *c, c*; and fig. 7, is a side view of one of the tenter pieces. These tenter pieces are blocks of cast-iron, which have two teeth or cogs 1, 1, formed in their under side, as ordinary straight rack teeth, and also two gudgeons or studs 2, 2, cylindrically formed, extending from their sides. A series of steel pins, straight tenters, or points 3, 3, 3, are fixed about the eighth of an inch apart, upon brass ribs, or narrow plates, which are to be firmly screwed upon the cast-iron piece, as shown in these figures. The gudgeons, or projecting studs 2, 2, are intended to run freely in

grooves, accurately planed in the two cast-iron cheeks of the rail or frames *c, c,* for the purpose of guiding the sliding tenter pieces. Now, a system, or complete series of these tenter pieces, so furnished, with points or pins placed end to end, or in immediate contact with each other, and kept in consecutive connexion in the groove of the rail, or between the cheeks of the framing *c, c,* will evidently form a continuous tentering frame, with fine points or needles upon the upper edge, and a continuous rack of spur teeth in the under part, which may be acted upon by an ordinary toothed wheel, or pinion, for the purpose of setting the whole series of tenter pieces, or separated parts of the tenter frame, in progressive sliding motion, as a common straight rack, although formed of separate loose portions merely lying end to end, or in consecutive connexion with each other. This will be perfectly seen by reference to the detached figure 8, which is one end of the framing *c, c,* as figure 4, but drawn upon a larger scale, the side plate being removed. Upon the transverse shaft *f, f,* placed at each end of the machine, there are mounted two wheels *g, g,* the outer side rims of which are poligonally shaped, that is, have flattened surfaces, in order to afford a partial support for the tenter pieces as they are passing round them, in order that the points may enter the cloth, or leave the same, as may be required, and round the peripheries of these wheels are also formed teeth (as an ordinary spur wheel), for the purpose of taking into the racks, and thereby giving a continuous progressive motion to the systems of tenter pieces or points carrying the cloth through the machine. The bosses of these wheels must be peculiarly constructed, in order to accommodate themselves to the angle at which they will be required to be placed upon the car-

rying shaft, and this will be seen by reference to figure 9, which is a horizontal section of the wheel, with its boss attached to the shaft. There is also another pair of auxiliary toothed wheels or pinions *g*, *g*, placed about the centre of the machine, taking into the racks in order to assist in pushing forward the consecutive series of tentering pieces.

Having described the general and leading features of the improved machinery, we will now proceed to show the mode of putting the same in operation. It is to be understood that the cloth is first brought in a wet, and consequently shrunken, state to the system of hollow copper cylinders *h*, *h*, *h*, which are heated by the admission of steam to their interiors through their hollow axes, or otherwise, as may be found convenient, for the purpose of submitting the fabric under operation to a slight or gentle heat, previously to introducing it into the stretching machine. The fabric is passed from thence under the two wooden guide rollers *i*, *i*, which are suspended beneath the flooring, immediately under the feet of the workman attending the front, or feeding end, of the machine; it is thence passed over and under the tension bars or rails *j*, *j*, *j*, which bars have a slight lateral motion imparted to them by the feet of the operator working the treadles *k*, *k*. These lateral movements of the tension rail are for the purpose of slightly shifting or drawing the cloth sideways, that its edges or selvages may be accurately brought over the teeth or points of the tenter pieces by the hands of the workman. It will be perceived that the grooves of the rails or cheeks *c*, *c*, are placed upon a slightly inclined plane at the feeding end of the machine, by which means the teeth will very gradually rise into the selvages of the fabric, until they have taken firm hold;

their points or ends will then appear through the upper surface of the cloth. Power being applied to the driving pulley *l*, by means of a strap in connexion with a pulley upon the ordinary line shafting in the building wherein the machine is constructed, that power is communicated through the pair of mitre wheels *n*, *n*, to the longitudinal shaft *m*, *m*, and then by means of the three pairs of bevils *o*, *o*, *o*, to the transverse shafts *f*, *f*, *f*. These shafts *f*, *f*, *f*, impart the rotary motion to the toothed pinions *g*, *g*, *g*, which being in gear with the rack formed upon the under side of the tenter pieces *d*, causes them to proceed in their course through the machine, as the cloth or piece of goods is placed upon the points of the tenters at the feeding end of the machine, while in its shrunken or narrow state. The front or entering ends of the cheeks or bars *c*, *c*, *c*, *c*, are required to be slightly brought toward each other, and this is effected by constructing the frames of the bars with joints at the parts marked *p*, *p*. By these means the progressive motion of the tentering points, with the cloth securely held upon them, moving along the expanding rail, causes the fabric to be gradually stretched until it has arrived to the part *p*, whence it proceeds in parallel lines throughout the remaining length of the machine: the required distance apart of these parallel bars, frames or cheeks *c*, *c*, having first been adjusted by means of the screwed shafts *b*, *b*, *b*, *b*, in the following manner. There is a longitudinal shaft *q*, *q*, *q*, mounted upon suitable pedestals or bearings on the opposite side of the machine to the driving shaft, upon which shaft *q*, are keyed the bevilled pinions *r*, *r*, *r*, taking into corresponding wheels *s*, *s*, *s*, fixed upon the ends of the screwed shafts *b*, *b*, *b*, *b*; and by means of the winch *t*, which is placed upon the square of the

shaft *q, q,* at the feeding end of the machine, the workman in attendance is enabled to set the cheeks or frames *c, c,* to the required distance apart, that is, to the width which the cloth is intended to be when finished; and he is also enabled to set the frames *c, c,* at the entrance or feeding end of the machine, to the width of the piece, whatever that may be, which is entering the machine in its shrunken and contracted state. This is done by turning the hand wheels *v, v,* keyed upon the first screwed shaft *b**, having first put the pinion on the longitudinal shaft *q, q,* out of gear with the wheel on the end of the screwed shaft *b**. It will now be perceived, that if the interior of the chamber formed by the plates *a, a,* has been previously heated by the furnace below, or by hot air passing up the opening or flue *u, u,* the cloth, in passing, will become dried while in the extended or stretched state, being all the time held upon the parallel row of points or tenters; and that in so drying, it will consequently retain the width it has acquired or been stretched out to in passing through the machine.

Now, when the cloth has arrived at the further or delivering end of the machine, the tenter pieces, with the points, will descend, by passing under the wheel *g,* and the points will leave the selvages of the cloth. The cloth having become dried, as above, proceeds over the wedge-shaped pieces or inclined planes *w, w,* which are placed immediately under the lists; and, as the piece of cloth advances, these inclined planes assist the rise of the cloth, and effectually release it from the tentering points or pins, and it thence proceeds under the guide roller *x,* up to the pair of delivering rollers *y, y,* mounted in a cast iron framing above this end of the machine. The cloth is now delivered upon rolls, or upon the ordinary frame or table placed ready to receive

it, by passing through openings, or between rails in the vibratory delivering frame *s*, *s*, which is governed and made to reciprocate by the crank wheel and connecting rod, as shown in the drawings.

"Having above described the particular features of our improved machinery for stretching cloth or other woven fabrics, and shown the manner in which we should prefer to put the same in operation, we wish it to be understood, that we do not confine ourselves to the precise plan of working the said continuous or endless tenter pieces and racks, as shown in the drawings, as it will be very evident that they may be worked with similar effect in cylindrical, elliptical, or even eccentric races or grooves, instead of the horizontal manner, as shown in the drawings. And their ranges may be expanded or contracted by right and left handed screwed shafts, or by any other convenient means; or levers may be introduced for the same purpose, which mode of adjustment we do not claim; and it will also be evident that, should a machine be required to operate upon a certain quality of cloths, which shall be invariable in their finished width, the grooved rims or races (if constructed upon a cylindrical machine) for governing the travelling of the tenter pieces, with the points, may be made without the means of adjustment; that is, these grooved rails or races may be formed as eccentric curves, round the periphery of a cylinder, should such a machine be preferred: but we have shown the plan we prefer, and have found it to be the most practicable and advantageous; and although we have shown all the figures in the drawings upon a scale as before mentioned, we do not mean to confine ourselves to the precise form or dimensions therein laid down, nor to the materials of which any of the parts shall be made; but we claim,

as our invention, the parts or pieces carrying the tentering points or pins for the purpose above described; and to the continuous or endless rack formed by their immediate or consecutive contact; and also the mode of working them in grooved plates, cheeks, or frames, by which the said tenter pieces are governed and conducted through a stretching machine."—[*Inrolled in the Rolls Chapel Office, February*, 1837.]

Specification drawn by Messrs. Newton and Berry.

To NATHAN BAILEY, *of Leicester, in the county of Leicester, framesmith, for his invention of certain improvements in, or additions to, machinery for manufacturing of stocking fabric.*—[Sealed 1st August, 1836.]

THESE improvements in, or additions to, machinery for manufacturing stocking fabrics, consist in certain apparatus to be attached to the ordinary construction of stocking frames, for the purpose of carrying the thread longitudinally over the bearded needles by means of mechanism, instead of performing that operation by the hand of the workman as heretofore. In the wide stocking frames, commonly used by the manufacturers of the present day, several stockings or gloves, or distinct widths of such fabric, are made at one operation or movement of the machinery. But it is necessary, in some description of goods, occasionally, as the work goes on, to vary the distance or number of needles over which the thread of each stocking or distinct piece of work is thrown, for the purpose of producing the shapes; that is, widening and narrowing the fabric; as in the

formation of the calf and the small of the leg of the stocking. This, however, is attended with great difficulty and delay when several stockings are made at one time in the ordinary machines, as each thread has to be thrown separately, by hand; and it is particularly to obviate this inconvenience that this improved apparatus or mechanical thread carrier is adapted.

"Fig. 1, Plate III., is a front elevation of this improved mechanism, supposed to be attached to a stocking frame, the latter of which is but partially shown in the figure. Fig. 2, is a horizontal view of the same; and fig. 3, is a transverse elevation, taken partly in section: A, A, A, A, A, are parts of the framing of the ordinary machine; B, B, B, the bearded needles, fixed in the frame in three sets, for the purpose of making three distinct stockings, or other pieces of work; C, C, C, are the sinkers, mounted on the sinker bar D, D. The carriage, with the jack bar, is shown at E, E, E, and the presser bar at F, F, affixed to the arms G, G. These are all parts of the ordinary stocking frame, which is so well understood by workmen, and also its manner of operating to produce the fabric, that it will be unnecessary for me to show more of its construction or to describe its evolutions, as they form no part of my invention.

"Fig. 4, represents one of my improved thread carriers, detached from the machine, drawn on a larger scale. So many of these thread carriers as there are to be stockings, or distinct breadths of work produced in one machine, are to be applied, as at *a, a, a*, by attachment to a horizontal sliding rod *b, b*. These thread carriers are guided in their longitudinal movements by a fixed horizontal rod *c, c*, parallel to the former, upon which they slide to and fro, both rods being mounted in a rocking frame *d, d*, the form and position of which will be

seen in figs. 1, and 3. This rocking frame is supported by jointed arms *e, e,* moving upon studs, fixed in the side standards of the new framework *f, f,* and is connected by lateral links *g, g,* to the carriage E, so that, as the carriage, with the jacks, moves outward by the ordinary evolutions of the machinery, the frame *d,* is made to vibrate, for the purpose of withdrawing the thread carriers *a,* from the sinkers C, when the sinkers advance to bring the loops to the ends of the bearded needles.

"The rod *b,* with the thread carriers, is moved to and fro by means of another sliding rod *h, h,* mounted on the top rail *i, i.* This last mentioned rod, having an arm *k,* affixed to it, which, as the rod *h,* slides along, comes in contact with the side of a bent arm *l,* extending upwards from the lower sliding rod *b.* These parts I call the driving apparatus. This driving apparatus is put in motion by means of cords, attached to the ends of the sliding rod *h,* which cords pass over guide pulleys *m, m, m, m*; and are connected at their reverse ends to the slur wheel N, below; the slur wheel being actuated by the treadles under the machine, in the ordinary way.

"It will now be perceived that, if threads, from suspended bobbins, are brought down and passed through the respective thread carriers *a,* as shown at *j,* in fig. 8, that by the action of the treadles upon the slur wheel, the cords will be made to draw the sliding rod *h,* along the top rail *i,* and cause the rod *b,* to conduct the thread carriers *a,* with the threads, over the upper surfaces of the bearded needles.

"This being understood, it is now necessary to show by what means the travers of each thread carrier is limited to the extent of the work, that is, made to conduct the thread over the required number of needles;

and no further, according to the regulated breadth of the work.

"To the upper part of the rod *h*, two small pieces or fingers *n*, *n*, are firmly fixed by screws; which fingers, as the rod *h*, slides along, are intended to act alternately upon one of the apparatus, which I call the depressors *o*, *o*. These depressors each consist of a straight bar at top, supported by vertical pins set in the under side of the bar, and passed through sockets *p*, *p*, fixed to the stationary rail *i*. The bar *o*, is kept in its elevated position, as seen toward the left hand in fig. 1, by slight springs acting under it, but is depressed as shown toward the right hand in the said figure, by the finger *n*, passing over it. It will be observed that the outer end of each bar *o*, is bent downward, forming a small inclined plane at *q*. This inclined plane enables the finger *n*, as it moves along, to mount up to the top surface of the bar *o*, and by so doing, to depress the bar *o*, as shown toward the right hand of fig. 1. At the ends of the bars *o*, *o*, pendant arms *r*, *r*, are affixed, the lower parts of which act upon brackets *s*, *s*, connected to the rocking frame *d*, *d*. Hence, as the finger *n*, slides along the bar *o*, it depresses that bar, and causes it, by means of the arms *r*, *r*, depressing the brackets *s*, *s*, to move the rocking frame into the position shown at fig. 3, and thereby raise the thread carriers *a*, *a*, *a*, above the bearded needles B. The progress of the bar *h*, sliding along the rail *i*, as before described, causes the thread carriers *a*, *a*, *a*, to bring the threads over the upper parts of the series of bearded needles; and when the finger *n*, has passed to the end of the slider plate on the bar *o*, it slips off the bar, and allows the depressor immediately to rise, which releases the rocking frame *d*; when the bent arm *l*, falls from the driver, and the

thread carriers drop down between the needles, thus limiting the extent or breadth to which the work is to be produced upon the needles. In order to prevent the bar, with the thread carriers, from accidentally passing on too far by the momentum when the machinery is in rapid action, stops are placed at *t*, *t*, upon the rocking frame, which are formed by sliding bolts adjustable to the required breadth of the work; and these are held fast in their positions, each by a spring lever *n*, a tooth in the end of which falls into a rack on the upper side of the stop bolt. And, further, there is another safety stop or catch 1, jointed on the end of the bar *b*, its longer end bearing upon the fixed rod 2, attached to the framing *i*; the lower end of this catch has a tooth or ratchet, which takes into the teeth or notches on the piece 3, attached to the rocking frame *d*; this catch keeps the bar *b*, from rebounding after it has passed across the frame, the tooth of the catch slipping into the notches.

"On the return of the sliding bar *h*, the other finger *n*, acts in a similar way upon the left hand depressor, raising the thread guides *a*, as before, and carrying them to the required extent over the needles, and then letting them fall as described in the former instance.

"In order to produce the narrowings, that is, to reduce the width of the work, the length of the slider plate on the upper surface of the bar *o*, must be made capable of contraction. This I effect by sliding it in a groove in the upper side of the bar *o*, as shown at *v*, *v*, in fig. 2. Having slidden the plate *v*, to the extent corresponding with the intended width of the work, I make the slide fast in that situation by a spring lever *w*, which has a tooth or catch dropping into one of the notches of the rack on the edge of the bar *o*; and when I wish to narrow the work, I slide the plate *v*, with its catch

lever, one or more notches backward, in order that the finger *n*, may escape from the bar earlier, and drop the thread carrier one or more needles short of the preceding course. I will here observe, that in order to allow the fingers *n*, to slide under the bars *o*, on their return, each inclined plane *q*, is formed by a small jointed flap, which rises as the finger passes under it.

"Having, by a succession of operations, produced certain lengths of work, say the lengths of the legs of stockings down to the ankles, it will then be necessary to separate the continuation of each of these pieces of work into distinct portions, with selvages, for the formation of the insteps and the two parts of the heels. This I effect by the introduction of two additional horizontal sliding rods *b* 1, and *b* 2, each having thread carriers *a* 1, and *a* 2, affixed to them; and these I mount in the machine, and act upon them in the way before described in reference to the sliding rod *b*, in figs. 1, 2, and 3.

"Fig. 5, represents a horizontal view of the top part of the rocking frame, with the first described sliding rod *b*, and its thread carriers *a*, *a*, *a*, mounted thereon, and also the additional sliding rods *b* 1, and *b* 2, with their thread carriers *a* 1, *a* 1, *a* 1, and *a* 2, *a* 2, *a* 2, connected to the rocking frame by hooked bearings *x*, *x*, *x*, and guide pins *y*, *y*, see fig. 1, the rod *b* 2, being confined in its situation by a clasp lever fixed at the left end of the rod. In this case, a T-head or transverse piece is fixed on the end of the driver *k*, as shown, by dots, in fig. 2, for the purpose of striking against the bent arm *l*, as the rod *h*, moves along the bar *i*; and there are adjustable sliding stop bolts *u* 1, and *u* 2, for regulating the extent of action of these additional rods *b* 1, and *b* 2.

"These additional parts of the apparatus being at-

tached and adjusted to the required widths of the insteps and heel parts, the machine is put in motion as before, when, by the sliding of the rod *h*, the thread carrier *a*, with the rod *b*, will be first moved along for producing the insteps; and, when advanced a proper distance, the bent arm *l*, will come in contact with stops on the rods *b* 1, and *b* 2, and the three rods will then all move together, conducting the thread carriers over the several series of needles. As, however, the distances are considerably reduced which the thread carriers have now to travel in making these narrow breadths, the fingers *n*, are not to be passed along the whole extent of the bars *o*, *o*, therefore, by sliding the adjustable plates *v*, *v*, a recess in the edge of each plate will be brought opposite to a recess *z*, in each of the bars *o*, which will allow the finger *n*, to fall through when it arrives there, and, by that means, suspend the operation.

"In order to make or work the feet of stockings, which have been produced by the means above described, I remove one of the sliding rods (*b* 2,) and lock together the other two sliding rods *b*, and *b* 1, and having attached six stocking pieces to the bearded needles, in the ordinary way, I am enabled to produce the footing to these six stockings at one operation, by the same means or mode of working the machinery as that described in forming the legs and feet.

"Lastly, I wish it to be understood that I lay no claim to any part of the construction or mode of working the stocking frame for the production of several pieces of stocking goods in one machine; but I claim as my invention, and as the subject of the improvements secured to me under the above recited Letters Patent, the mechanism to be attached to a stocking frame for conducting the threads by machinery instead of throw-

ing them by hand, consisting of the thread carriers attached to sliding rods with suitable stops and adjustable pieces for regulating and determining the extent of their movements in connexion with the necessary mechanism for actuating the same."—[*Inrolled in the Rolls Chapel Office, February*, 1837.]

Specification drawn by Messrs. Newton and Berry.

To JOHN YOUNG, *of Wolverhampton, in the county of Stafford, patent locksmith, for his invention of certain improvements in the making or manufacturing of metal hinges for doors, and other purposes.*—[Sealed 7th June, 1836.]

THIS invention of certain improvements in the making or manufacturing of metal hinges for doors, and other purposes, has for its object the making or producing of metal hinges with solid knuckle or hinge joints, out of peculiar formed or shaped strips or lengths of rolled, drawn, or swaged malleable iron, or brass, copper, or such other metal, or mixture of metals; such improved hinges, with solid knuckle joints, being stronger and neater, and, in my opinion, much more preferable than those in which a part of the metal is turned over or coiled around a centre pin, or mandril, in order to form the knuckle or hinge joint, and consists in forming such metal hinges from out of strips or lengths of metal rolled, drawn, or swaged into peculiar shapes for forming such hinges: that is, with a rib or ribs projecting therefrom, intended to form the knuckle, or hinge joint, and which strips or lengths of metal are afterwards cut up or severed by means of proper shaped tools, cutters, or

punches and dies, into the required lengths for making such hinges, which portions of the lengths of metal are afterwards, or at the same time, cut or properly shaped, or formed into the two parts, sides, or wings, for making the said hinges; which parts, sides, or wings, afterwards have the holes for the admission of the centre pin drilled through the solid metal, or projecting rib, intended to produce the knuckle or hinge joint; and further, are properly fitted into each other, and the screw holes in the wings punched or drilled and countersunk in the usual manner to constitute the complete hinge. In order the better to illustrate my said improvement, and the manner of carrying the same into effect, I have shown in Plate III. several different shapes or forms of metal, and also some of the cutters, dies, or punches, and tools used for severing or cutting out and making the said part, portions, or wings; although I do not mean or intend to confine myself to the particular form or construction of the tools therein shown, as the same may be varied to suit the operations and will of the manufacturer, and I have only given them by way of example.

The plan and sectional figures, 6, 7, 8, 9, 10, are representations of portions of strips of metal rolled, swaged, or drawn into the shape required to form my said improved hinges.

Fig. 6, has the rib or projecting part intended to produce the knuckle, or hinge joint, placed along the middle of the strip or length of metal forming the wings, and which is afterwards cut or severed by proper shaped tools or cutters into the portions shown at *a*, *b*, and *c*, to make the necessary part of the hinge; this may be done at one or more operations, as thought desirable.

Fig. 7, represents the projecting rib formed on only one side or edge of the strip of metal, the parts called the wings extending from it only in one direction, and which strip, or length, may be cut or severed, and formed by proper shaped tools into the necessary parts, as shown in figures *d*, *e*, *f*.

Fig. 8, shows another form of a strip, or length of metal, with ribs or projecting parts on each edge or side of the piece, which is afterwards cut or separated down the middle, as shown by the dotted line, into two parts or portions, which are then to be treated in the same way as that shown at fig. 7.

Another form or shape of strips of metal for making these improved hinges, is shown at fig. 9: that is, with the ribs for the knuckle joints projecting from the plate or flat part, at intervals only, instead of a continuous rib, as in the other figures. The one part, marked *h*, is for forming what is called the "male" knuckle, and the other part *i*, for forming the "female" knuckle joint; these shapes may be produced by indented, or grooved rollers, or by swaging tools, and are to be cut, severed, and formed by proper shaped tools into the several figures *k*, *l*, *m*, *n*.

Another shape or form is shown at fig. 10, and is also produced by indented rollers, or swaging tools; and when the same have been separated down the middle, as shown by the dotted lines in the figures, the separate parts are to be treated in the same manner as those shown at fig. 9, the transverse dotted lines in the figures showing the parts or portions required for one hinge.

The manner of working these strips, or lengths of metal, that is, drawing, rolling, or swaging, and the proper times and operations for producing these peculiar

forms and shapes of lengths of metal, will be well known by all practical workmen, and therefore it is not necessary for me to show or describe all the various methods, processes, or operations for making or producing the same; but I prefer rolling the metal with indented or grooved rollers, so as to produce the required forms, in preference to any other manner, although some of them may be produced by drawing or swaging.

Therefore, having first procured the shapes of metal, as shown in figs. 6, 7, 8, 9, 10, by rolling, drawing, or swaging, I first, by any proper revolving cutters, sever the lengths, if rolled double, as at figs. 8, and 10, into two parts, and then by proper cutters or tools, as a cutter, punch, and counter die placed in a fly press, sever the same into the required portions for making the hinge, and then by other tools, dies, or punches, cut away the superfluous parts, and form them into the required shape, to make the two sides, portions, or wings of the hinge: for instance, I take the part or portion of the strip or length of metal, and operate upon it with the tools shown at figs. 11, 12, 13, 14, 15, 16, and 17.

Fig. 11, is a front elevation of a pair of tools or dies and punches for making the female knuckle joint. Fig. 12, is a side elevation of the same, both showing the piece of metal *o*, placed in the lower die, ready to be operated upon. Fig. 13, is a plan-view of the lower or counter die. Fig. 14, is a side elevation and section of the tools and dies after being put into operation, and the superfluous part of the piece of metal *o*, separated or cut off. Fig. 15, is a front view of a pair of dies or tools for forming the male side or knuckle joint of the hinge. Fig. 16, is a plan of the lower or counter

die belonging to the same; and fig. 17, is a sectional elevation, showing the cutter just about to operate upon the piece of metal *o*. All these tools or dies and punches may be mounted in an ordinary fly press, and worked by hand or steam power, as desired.

Having thus produced the necessary parts for forming the hinges, I proceed to drill the holes for the centre pins, and the screw holes in the wings, and complete the hinge by fitting the parts together in the usual manner.

Having now particularly described my invention, and the manner of carrying the same into effect, I wish it to be understood that what I claim as my invention, and secured to me by the above in part recited Letters Patent, is the making or manufacturing of metal hinges for doors and other purposes from out of the above described peculiarly shaped or formed strips or lengths of metal, such strips or forms being produced in malleable iron, or in brass, or copper, or such metal or mixtures of metals, by rolling, swaging, or drawing.—[*Inrolled in the Rolls Chapel Office, December*, 1836.]

Specification drawn by Messrs. Newton and Berry.

To James Hellewell, *of Springfield-lane, in the borough of Salford, and county of Lancaster, dyer, for his invention of an improved process or manufacture, whereby the texture of cotton, and certain other fabrics and materials, may be rendered impervious to water.*—[Sealed 28th November, 1835.]

These improvements, in the process whereby the texture of cotton and certain other fabrics and materials may be rendered impervious to water, consist in steep-

ing the fabric, intended to be made waterproof, in a peculiar solution, which has been previously prepared for the purpose, in vats or cisterns of any required dimensions and material, and which are to be situated in any convenient position, so as to carry on the process to the required extent, and in the most advantageous and convenient manner to the operator. It is generally known that the waterproof cloths which have been found superior to others, and which have been mostly adopted for the purposes of wearing apparel and other similar uses, are composed of two pieces of material cemented together with a preparation of caoutchouc, or other material, and thereby rendered totally impervious to air as well as water, which fabrics (usually called "double texture") are exceedingly detrimental and repulsive to the action of natural perspiration, to obviate which defects my improvements are principally designed, and the expense of rendering manufactured articles perfectly waterproof is greatly reduced by their being of single texture only, and merely steeped or saturated in the solution hereafter described, which is found to make it repel the action of the water, and prevent its running through the fabric, and at the same time leaving the fibres of the cloth sufficiently open to allow the necessary passage of air.

I presume, as the principal feature of novelty and improvement is now understood, and the object of my invention sufficiently explained, a description of the ingredients and their relative quantities will only be needful to render my invention fully and most perfectly understood; and as by experience I have found that dyers, and persons accustomed to use such like processes, in general mix their solutions with particular regard to the weight of the manufactured material to be

steeped therein, and without any reference to its length or width (which is always so much more variable than its weight), I shall describe my process in pursuit of the same plan, being most approved, and generally found the most correct. The mixture of ingredients I have hereafter described, will be found the best quantity in which to saturate or steep fabrics to the weight of 1000lbs. avoirdupoise. When the cisterns or vats have been previously disposed so as to contain the proper quantities of materials, mix in one large vessel (which may be subsequently divided) about 200 gallons of water with about 120lbs. of common alum in its crystalized state, commonly called rock alum, and for the purpose of rapid dissolution, I prefer that the alum should be previously ground or pulverized; to this mixture add, in small quantities, about 80lbs. of common whiting (chalk cleared of impurities, and ground in a mill). It will now be found by this addition, a considerable effervescing action has taken place, and a chemical change has also been effected, whereby the sulphuric acid, of which the alum principally consists, is perfectly destroyed, and the alumina, which is the residuum I require, left entire; now the alumina being in a state of solution, and remaining with the water, the whiting and other unnecessary parts will precipitate and remain at the bottom of the vessel; when entirely cold the liquor may be drawn off, leaving the impurities and sediment in the vessel in which the preparation has been made, and in this state is ready for immediate use. The cloth or fabric intended to be saturated is now to be introduced into suitable vessels containing the above-mentioned solution, and either allowed to remain, to be thoroughly steeped, or merely passed through the solution, as found most convenient,

provided that the cloth is sufficiently saturated. I also wish it to be understood that I have found acetate of lead (sugar of lead) to have the same effect in destroying the sulphuric acid contained in the alum, but it is much more expensive, besides leaving a quantity of acetic acid in the solution, which will be found injurious to many colours, of which the fabrics may happen to have been dyed. The cloth is now to be taken to a vat or vessel containing a mixture of water with common yellow soap, allowing about 3lbs. of soap to every 50lbs. of cloth, and to be mixed with about 30 gallons of water, either more or less, as shall be found by the experience of the operative to have the desired effect; the soap may either be dissolved by boiling, or cut into pieces and boiling water poured on to it, and when it has cooled to about 100 degrees Fahrenheit, the cloth is to be passed quickly through the solution in the most convenient manner. This part of the process is for the purpose of strengthening the repellant qualities of the cloth, which have been subjected to previous saturation, and fastening the alumina, which has been taken up by the cloth during the former process, that is, preventing it from being washed out or destroyed. By way of cleansing the fabric, which is now rendered perfectly repellant and impervious to water, from any impurities, such as the soap-lees or other extraneous matter which it may have taken up during its passage through the processes above described, I now pass the same through cisterns of clear water, in any convenient manner, and after being dried the cloths are ready for use, some qualities of which may require to be finished or calendered in the usual manner. Although the principal object of this invention is intended to be used for such goods or materials as are manufactured

from cotton, I wish it to be understood that I will not confine myself to that fabric alone, as it must be evident that wool, silk, linen, or any other fibrous substance, may be subjected to similar processes with the same advantageous effect. Nor do I mean to confine my claim to the use of the precise quantities here specified, as they are mentioned merely for illustration, and are such as I have found to be most convenient and beneficial.—[*Inrolled in the Rolls Chapel Office, May,* 1836.]

Specification drawn by Messrs. Newton and Berry.

To JOHN HALL *the younger, of Dartford, in the county of Kent, engineer, in consequence of a communication made to him from a foreigner residing abroad, for an improvement in machinery used in the manufacture of paper.*—[Sealed 3d August, 1831.]

THIS is an apparatus to be introduced into the engine in which rags are beaten when converting them into pulp for making paper. It is a cylindrical strainer, capable of drawing off the dirty water from the engine, and yet preventing the escape of the fibres of the rags, which, without such an apparatus, are subject to pass off with the water, and thereby become wasted.

The strainer is constructed of three or more rings affixed to an axle, which are connected together by longitudinal rods or bars placed parallel to the axle round the rings, thereby forming an open drum or lantern cylinder, the periphery of which is to be covered with wire gauze. This cylinder, when so constructed, is mounted in the water-way, or elliptical vessel, of the

engine, its axle turning in plummer blocks fixed, the one on the edge of the vessel, the other upon the central plank, and its ends are properly packed against the wood-work, in order to prevent the escape of the water, except by its passing through the periphery of the drum.

One end of this cylinder is open, having a communication with a lateral trunk, which carries off the dirty water through this strainer, away from the engine, but the wire gauze round the periphery of the cylinder prevents the fibres passing with the water.

The rotary action of that well-known part of the engine called the beater, causes a constant revolving motion of the water and pulp round the elliptical vessel, thereby throwing the pulp upon the strainer, but its wire gauze covering and preventing the passage of the fibres, the water alone is allowed to flow away.

This strainer is made to revolve by bevel gear upon the end of its axle, connected by other wheels to the rotary beater.—[*Inrolled in the Inrolment Office, January,* 1832.]

To JACOB PERKINS, *of Fleet-street, in the city of London, engineer, for his having invented certain improvements on his former patent, dated the 2nd day of July,* 1831, *making the same applicable to the evaporating and boiling of fluids for certain purposes.*—[Sealed 27th August, 1831.]

THE patent alluded to, upon which the present is said to be an improvement, was for generating steam (see vol. i. of our Conjoined Series, p. 317), and consisted in the introduction of a partial lining in the interior of the boiler, this lining having openings at top and bot-

tom to allow of the free circulation of the water between the two surfaces, that is, the boiler and the lining, the hotter portion of the water passing from the bottom of the boiler up the side passages to the surface, and the cooler portion of the water descending in the middle of the boiler to supply its place.

The subject-matter of the invention in the present instance is precisely the same as before, and the object of this patent is to secure the exclusive right of applying the same contrivance to the boiling and evaporating of sugar, salt, worts, distillers' wash, and any other matters to which it may be applicable, the invention in the former case being confined to generating steam.—[*Inrolled in the Inrolment Office, February*, 1832.]

To JOHN CHANTER, *of Stamford-street, in the county of Surrey, and of Earl-street, Blackfriars, in the city of London, gentleman, for his invention of an improvement in furnaces.*—[Sealed 2nd September, 1834.]

THE subject of this patent is described as an improvement upon an invention, for which a previous patent was granted to Richard Witty, of Hanley, in the county of Stafford, "for improvements in apparatus for making and supplying coal gas for useful purposes," dated 10th June, 1828, (see the eighth volume of our Second Series, p. 247,) of which patent right the present Patentee has become the proprietor.

The principal feature of novelty proposed under this patent, is the placing of a quantity of coal in such a situation, within the furnace of a steam boiler, as shall allow of its becoming coked before it is let fall on to the grating or fire-place; and, for this purpose, an addi-

tional fire-grate, as the Patentee calls it, is constructed in the upper part of the furnace, upon which the coal is to remain whilst the coking process is going on; and the gas is given off and burnt. This resting place for the coal is a ledge extending across the furnace, immediately over the fire, and is formed by a hollow vessel, containing water, in communication with the boiler, and constituting one of its water chambers.

Plate I., fig. 8, represents a portion of the boiler of a locomotive steam-engine: *a, a, a,* are water chambers, or ways, for the circulation of the boiling water; *b*, is the fire-grate of the furnace; *c, c,* flues; and *d*, a bridge for interrupting the passage of the flame, and thereby promoting a more perfect combustion of the fuel. The coal, for the supply of the furnace, is placed in a hopper *e*, above, and is made to pass through a grating *f*, in order to prevent any large pieces of coal from descending. The feeding is effected in the ordinary way, by the rotation of a fluted roller *g*, made to revolve by means of any suitable mechanical contrivance connected to the engine, in order that the quantity of fuel supplied may be uniform. From the fluted roller the coal descends through a narrow channel on to the ledge *h*, and there remains to be distilled, that is, acted upon by the heat of the furnace below, which causes the coal to give out its gas; and this gas, becoming inflamed, greatly assists in communicating heat to the boiler.

The ledge *h*, is hollow, containing water; indeed, it is one of the branches or water-ways of the boiler, communicating to the main part by lateral passages, and in which, by the heat of the burning gas, a considerable quantity of steam is generated. A mechanical contrivance is shown at *i*, for pushing the coke forward off the

coking plate into the furnace; but this is not clearly explained. Certain parts of the furnace are lined with fire-brick, in order to protect it from the action of the fire. The fuel is raked forward on the grate bars by a hand rake, passed through the door in front; and the clinkers are discharged into the ash-pit below.

A modification of the above is described as applicable to a stationary steam-engine; but no other difference is proposed but in the form and dimensions of the boiler.

The Patentee says, in conclusion, "I claim, as my invention, the use of the additional distilling plane *h*, by the application of the water-course in steam-boat boilers; and of the additional boiler *h*, when applied to the boilers of fixed engines, with the connecting pipes or channels, and the improved arrangement of parts described by the above statement, and the drawings thereby referred to.—[*Inrolled in the Inrolment Office, March*, 1835.]

To OLIVER ST. GEORGE, *of Great Cumberland-street, in the county of Middlesex, Esq., in consequence of a communication made to him by a foreigner residing abroad, for certain improvements in machinery for acquiring power in tides and currents.*—[Sealed 28th September, 1831.]

THIS invention, which professes to be a means of acquiring power, is merely an apparatus for propelling boats on water, and to be actuated by steam. It consists of a series of paddles attached to endless chains, which are made to travel by the rotation of carrying wheels, over which they are distended.

As this is at least the twentieth time that the same means have been proposed and patented for propelling vessels on water, we shall not be very detail in our description of the apparatus.

A frame of rails and cross pieces, of suitable dimensions and strength, carrying the propelling apparatus, is to be attached to the boat, or vessel, and to be made capable of being drawn up out of the water or let down into it, as may be required. Over two drums, or rim wheels, mounted in the frame, two endless chains are to be distended, and to these chains the series of propellers, or paddle-boards, are to be attached by hinges. Rotary power being applied, by means of a steam engine, to the carrying drums or wheels, they having radial spurs or studs taking into the links of the chains, will, by their rotation, cause the chains to be driven onward, and hence to drag the paddle-boards through the water, the resistance of which against it is to be the means of propelling the vessel in the contrary direction.

The paddle-boards hanging on hinges are kept in perpendicular positions as they pass through the water, by stops placed behind them; but as they rise up out of the water, they are allowed to fall back on their hinges, so as to make no resistance.

The Patentee falls into the old error in stating that the power (effect) will depend upon the number of propellers used, and will be acquired in proportion to the force of resistance in the tide or current.

When the progress of the vessel is to be stopped, the whole of the frames on both sides of the vessel, with the paddles, are to be drawn up out of the water by chains and pulleys attached to vertical standards on deck.—[*Inrolled in the Inrolment Office, March,* 1832.]

To JOHN WHITING, *of Rodney-buildings, New Kent-road, in the county of Surrey, doctor of medicine, for his invention of an improvement or improvements in preparing certain farinaceous food.*—[Sealed 3rd May, 1836.]

THIS invention relates to the preparation of all kinds of farinaceous food, which require to be rendered spongy, as bread cakes, light biscuits, and such other substances. And the Patentee's improvement or improvements consist in preparing such food by means of an acid and an alkali, (such alkali being in union with carbonic acid), the same being rendered, as the Patentee states, cellular light (spongy), without the aid of fermentation. The acid he employs in the manufacture of bread is muriatic acid, called also hydrochloric acid, and spirits of salt), and the alkali used is carbonate of soda, or what is considered to be by chemists a sesqui-carbonate, or bicarbonate. When these two articles, namely, the muriatic acid and carbonate of soda, are mixed together in proper proportions, the following changes take place: namely, two of the ingredients which they contain, combine to form common salt, two other ingredients combine to form water, while the carbonic acid is separated in the form of gas, and accomplishes all the duties performed by the carbonic acid extricated during the common fermentative process of making bread (which fermentative process the Patentee considers to be prejudicial), whether produced by permitting the dough to rise, the result of spontaneous decomposition, aided by standing and heat, or by aiding such fermentation by yeast, as is the common practice, or by any other ferment.

He then proceeds to explain the manner of carrying his invention into effect, and illustrates the same by

instructing us how it may be performed in the manufacture of bread.

To form seven pounds of wheaten flour or meal into bread, mix from 350 to 500 grains of the carbonate of soda above mentioned with about two pints and three quarters of distilled water (the quantity of the alkali being made to vary within the limits above mentioned, as the baker finds most convenient, and depending on the degree of lightness required). Mix with three quarters of a pint of water, in a separate vessel, so much of pure muriatic acid as will neutralize the quantity of carbonate of soda that is employed, the quantity of the muriatic acid varying according to the known specific gravity of the same, and the quantity of soda in the carbonate, which are subjects familiar to chemists, from about 420 to 560 grains of the common acid of commerce.

The Patentee states that he has found, experimentally, that about 350 grains of the carbonate of soda are required; and that, as bakers are not usually acquainted with chemistry, in order that they may adjust the proportions of the muriatic acid and the alkali, they must depend upon some person who is possessed of sufficient chemical knowledge: for that purpose, the flour must be divided into two equal portions; to one portion, which is put into a wide earthenware pan or trough, the solution of the soda must be gradually poured in, at the same time well stirring and beating the mixture with a large wooden spoon, or other suitable instrument, for the purpose of forming a uniform batter, free from all lumps. All pieces adhering to the sides of the pan and spoon, must be scraped down into the batter before the mixing is finished. Upon this batter, the other portion of the flour is then thrown; and while in the act of

briskly stirring them together from the bottom, pour in, gradually, the diluted muriatic acid; then let the dough be formed; and while in a rough state, let it be thrown on the board, and lightly kneaded with a biscuit brake or rolling pin for a few minutes, doubling and rolling it until it becomes blended, and quite uniform and light, care being taken, however, that this process is not continued too long. When this is accomplished, the dough may be lightly moulded with dry flour, and baked in loaves distinct from each other, and not very large (from half a pound to a pound and a half weight of dough each). The bread, in some ovens, is found to turn out best when baked under tins, in the form called, in London, Coburg, or Coronation loaves.

The oven should be hot enough to raise the dough quickly, but not so hot as to bind the crust too soon. The bread requires to be well soaked (as it is technically termed by bakers), it being apt to retain too much moisture if it be not sufficiently long in the oven. The process of mixing should be conducted in a cool place, and the water used should be as cold as can be procured, especially in hot weather. Common salt may be added, in quantities sufficient to flavour the bread. The quantity of common salt formed by the ingredients used is about 280 grains, when 350 grains of the aforesaid carbonate of soda are employed; and a little addition of common salt, about half, or three quarters, of an ounce, which is to be dissolved in the diluted acid, will generally improve the taste of the bread. The quantity of water above mentioned will be found to correspond with from half a pound to one pound of flour, but this must vary with the strength of the flour, and rather a soft dough is better than that which is stiff. Great care must be taken in the mixing, in all cases, to

secure a perfect union of the acid and alkali, otherwise the bread will be discoloured.

Having thus described the means of performing his improvement, the Patentee states that he would remark, that soda and carbonic acid in their other chemical combinations, as the common chrystalized carbonate (called sometimes sub-carbonate), or the dried carbonate, or the true bicarbonate, may be employed for the same purpose, care being observed to obtain the formation of a sufficient quantity of gas, and to form a neutral mixture of the acid and alkali, that is, to produce common salt, as above explained. The Patentee also remarks that he does not confine himself to the precise means of mixing, hereinbefore explained, as the same may be varied, provided the object of the invention be kept in view, which is that of neutralizing the ingredients used, and producing common salt, and also causing the bread to be cellular light (or spongy) as above described.

When eggs, milk, butter, sugar, and spices, are to be used in making different kinds of light cakes, the same may be mixed with one portion of the flour before the alkali is added to it, and the dough made as above described, only it must be rendered stiffer by the addition of flour and by pressure, in the same way that is employed in preparing dough for these sorts of cake in the ordinary process.

The flour of rye, and that of barley and oats, when mixed with some of wheat, may be made into bread in the same manner; and potatoes (which must, on no account, exceed one third by weight of the quantity of flour intended to be made into bread, the other two thirds being of wheaten flour); and rice may also be used with wheaten flour, though the bread will generally be considered best if made wholly of wheaten flour.

Having thus described the nature of the invention, and the manner of performing the same, the Patentee concludes by saying, "that he is aware that carbonate of soda, carbonate of ammonia, and carbonate of magnesia, have been used in preparing some kinds of farinaceous food (and some acids also); he does not, therefore, claim the use of those materials generally, in preparing farinaceous food; but what he does claim as his improvement or improvements, is the preparing such food by means of an acid and an alkali (such alkali being in union with carbonic acid), whereby the foods are rendered cellular light and spongy, without the aid of fermentation, as above described."—[*Inrolled in the Inrolment Office, November, 1836.*]

To John Hewitt, *of Kennegie, in the county of Cornwall, gentleman, for his invention of a combination of certain materials or matters, which being combined or mixed together will form a valuable substance or compound, and may be used with, or as a substitute for, soap.* —[Sealed 19th April, 1834.]

This invention consists in combining one or more of the substances generally known by the name of mica, steatite, card or guard and porcelain earth, with the ordinary materials of which soap is composed. The mica, steatite, or other materials above mentioned, must be first reduced to a very fine and impalpable powder, and then mixed, either separately or in combination with one or two other of the above-named substances, in the proportion of from one eighth to three fourths by weight of either of these materials, with from seven eighths to one

fourth of the ordinary soap of commerce, commonly known by the name of yellow soap.

The mixing process is carried on in the following manner: the ordinary soap of commerce is sliced up, and with it is mixed the above material or materials in the proportions above described, the whole is then put into a suitable vessel to be melted, water being added to aid the operation.* When the ingredients are properly mixed, the contents of the vessel is allowed to cool, and then is to be cut out into bars, as is usual in such cases.

The Patentee states, that he finds the proportion of about one half of the siliceous materials to one half by weight of the saponaceous materials to be the best proportion for common soaps, and that the ingredients must not be mixed in any other proportions than those above mentioned, viz. from one eighth to three fourths, as the desired effect will not be obtained if the ingredients are mixed in any proportions either more or less than these.

For making fancy or toilet soaps, the Patentee uses curd, instead of yellow soap, and he lessens the proportion of the siliceous ingredients.

In conclusion, the Patentee states, that he does not mean or intend to claim as his invention the application of any siliceous material to the manufacture of soap, as he is aware that such materials have been applied to cleansing before; but he claims as his invention the application of the above-named materials in the before-

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* The Patentee here states, that the siliceous ingredients may be added before the soap is allowed to cool, when it is manufactured; and it must be evident that this is the most economical way for the manufacturer.

mentioned proportions: viz. from one eighth to three fourths by weight of the siliceous ingredients, to from seven eighths to one fourth of the saponaceous materials in the manner above described.—[*Inrolled in the Inrolment Office, October*, 1834.]

List of Patents

Granted by the French Government from the 1st of July to the 31st of October, 1836.

(Continued from vol. x., p. 379.)

To Solms and Badat, of Paris, for an improved furnace for the making of coke.

— François Lergent, of Paris, for improvements in the making of steel spoons and forks.

— Pierre Joseph Ende, of Affranville, for a means of applying a chronometer to the measuring of gas.

— Edouard Largier, of Paris, for a distilling apparatus.

— Jacques Desiré Allier, of Tens, near Peronne, for a means of preserving thrashed corn.

— Letault Cairo, Youndan-Dupontillac, and Roboglia, of Paris, for a bituminous cement.

— William Patterson, of Dublin, for a new substance for tanning leather.

— Caiman Duverger, of Choisy sous Etoiles, for an apparatus for cleaning corn.

— Claude Allier, of Paris, for improvements in clocks and watches.

— Evrard Diendonne, of Bethel, for an improved machinery in combing wool.

— François Martin Desgranges, of Paris, for a method of manufacturing various articles with whalebone.

— Pierre Giraud, of St. Etienne, for improvements in the manufacturing of bricks.

To François Regis Boyer, of Roanne, for an improved batten for weaving ribbons.

— Claudius Fellot, of Lyon, for a method of manufacturing tiles for the flooring of houses.

— Pierre François Jeanson, of Vitry le Français, for a fire-engine.

— Vergne de Guérini, of Marseille, for a method of reviving animal charcoal.

— Etienne Melchion, of Marseille, for an apparatus for warming the water used for bathing.

— John Byrne Madden, of Orleans, for two methods of towing vessels up rivers and along canals.

— Louis Marie Lemoine, of Rouen, for an improved condenser.

— Moses Poole, of London, for an improved method of tanning.

— Cordier Lalande, of Paris, for a pump applicable to mechanical lamps.

— Jean Baptiste Moinier, of Marseille, for a machine for pulverising plaster of Paris.

— Marquis de la Rochejacquelin, of Clisson, for an improved steam-engine.

— Claude François Prost, of Beaune, for a hydraulic apparatus applicable to lamps.

— Cabane, senior, of Marseillan, for improvements in steam-engines.

— William Auguste Robertson, of London, for improvements in the tanning of hides.

— Adolphe Carriére, of Ganges, for a reed for separating the threads in the spinning of silk.

— Auguste Alexandre Costel, of Troyes, for improvements in the stocking frame.

— Darvien, Cauvy, and Durand, of Ganges, for a method of stifling the cocoons with dry heat, and without injury to the silk.

— John Shaw, of London, for improvements in the apparatus employed for cooling liquids.

— François Felix Sauliere, of Argenteuil, for an improved nail machine.

— François Rebouil, of Marseille, for a new motive power.

To Sailly Herbelot, junior, Genet Dufray, of Calais, for an improved method of manufacturing spotted net.

— Michel and Henri Louis Chuard, for an improved engine called by them hydrargiro-dynamique.

— Charles Antoine Dueret, of Dôle, for improvements in clock work.

— Pierre Frédéric Lenfant, of Paris, for a moveable pillow to be used by travellers in stage coaches.

— Jean Baptiste de Lagarde, of Paris, for a chemical composition which cures of their diseases fruit trees.

— Frédéric Wilson, of London, for improvements in the apparatus used for loading and unloading ships.

— Paul Descroizilles, of St. Quentin, for an expeditious method of bleaching cotton or other fabrics.

— Jean Baptiste Nicolas, of Lyon, for an improved oven for baking white pipe clay, with an opaque enamel.

— Guillaume Rosé, of Paris, for a method of conveying non-compressed gas.

— Dietz Father, of Brussels, for a new locomotive coach.

— John Vaizey, of London, for improvements in the preparing of floury substances.

— Jean François Perrére, of Paris, for a new kind of calefyer.

— Lan and Monin, of Belleville, near Paris, for an apparatus for measuring liquids.

— Rabenstien, of Paris, for a new system of weaving.

— Rousseau, of Epernay, for a machine for preparing sparkling wines.

— Louis Vinot, of Paris, for a steam coach, calculated to run on common roads.

— Achille Monvirsin, of Paris, for improvements in pianos.

— Large and Quignard, of Paris, for an apparatus for preventing the escape of mephytic gases from privies.

PATENTS FOR FIVE YEARS.

To Sampson Mordan, of London, represented in Paris by Mr. Perpigna, Advocate, of the French and Foreign Office for Patents, Rue Choiseul, for certain improvements in pens.

To François Tau, of Uzes, represented by Mr. Perpigna, for an improved calefyer.

— Jean Alexandre Edouard Girault, of Ouzaine, represented by Mr. Perpigna, for a means of depriving sulphate of quinine of its bitter taste.

— Lauriel, Brothers, of Nantes, represented by Mr. Perpigna, for an improved bevel wheel.

— Camille Alexandre Senés, of Marseille, represented by Mr. Perpigna, by a means of driving roasting-jacks by smoke and air.

— Alexandre Yvres Gaveaux, of Paris, represented by Mr. Perpigna, for improvements in printing presses.

— François Grane, of Paris, for a preparation of polishing furniture and leathers.

— Le Roux Durandrie, of Nantes, for an improved fire log.

— Frédéric Mahr, of Paris, for improvements in pianos.

— Jean François Fiants, of Paris, for a nail machine.

— Benoit Jean, of Paris, for an oven for baking plaster, lime, and bricks.

— Pierre Barthelemi Guimbert Debal, of London, for a new kind of weighing machine.

— Louis Firmin Chierry, for improvements in locks and bolts, applicable to the inner doors of a house.

— Charles Auguste Tremsank, of Bordeaux, for improvements in steam boats.

— Sylvain Maneuvrier, senior, of Limoges, for improvements in cutlery.

— Jean Julien Josselin, of Paris, for improvements in the make of ladies' stays.

— Daniel Napoleon Predhomme, of Paris, for a new dentifrice.

— Chaulaire, father and son, of Paris, for a means of replacing, with advantage, the use of oars in boats.

— Jean Chrysostome Marie Joohant, of Paris, for a means of sticking bills, so as to render them visible by day and by night.

— Jean Baptiste Boubel, of Paris, for pectoral lozenges.

— De Tressot and Co., of Paris, for a new varnish, made with gum laque.

To François Théodore Lerien, of Paris, for a new kind of knitting.
— Jacques Christophe Labbaye, of Paris, for an improved keyed trumpet.
— Xavier Jean, of Paris, for the adaptation of certain fibrous substances to all the uses of flax and hemp.
— Paris, Lecrosnier, and Tremblai, of Dijon, for a new musical instrument.
— Jardin Letourneur, of Falaise, for improvements in the knitting frame.
— Count de Chalus, of Vendre, for an apparatus for towing boats in canals and rivers.
— Philibert Jules Nicolas Baudot, of Paris, for a circular sawing engine.
— Aymard de Beaulieu, of Paris, for a powder for rubbing up furniture.
— Gottefried Penzoldt, of Paris, for a new method of drying the fleeces of wool after they are shorn from the sheep.
— Jacques Frédéric Haller, for an improved globe.
— Jean François Geers, of Deville, for improvements in calico printing.
— François Aimé Curé, of Paris, for a pectoral syrup.
— Louis Alexandre Picard, of Paris, for improved artificial teeth.
— Louis Lafont, of Agen, for a triangular clock.
— Hyacinthe Pitay, of Paris, for a process for preventing the formation of molasses in sugar refinery.
— Joseph Esprit, of Lyon, for a new system of artificial mountain.
— François Crucq, of Lille, for a seat for privies, impervious to gases.
— Etienne Challiot, harp-maker, of Paris, for a new mechanism applicable to harps.
— Piere Antoine Campunaud, for improvements in brush-making.
— Dubas Bonnel, and Bajen, of Lille, for weaving glass, rendered malleable by steam.
— Louis Thomas Chatelain, of Nancy, for an economical stove.
— Demongert, of Orges, near Chaumont, for a means of directing balloons governable at will.

To Jean Jacques Zust, of Paris, for a machine for pouncing all kinds of drawings.

— Chanuc, senior, of Montpellier, for an improved press.

— Charles Fouilloux, of Marseille, for an improved baluster for stairs.

— François Huart, of Paris, for an improved pomatum for provoking the growth of hair.

— Seraphin Joseph Hubert, of Paris, for an improved apparatus for saving lives and property in case of fire.

— Clement Dubœuf, of Lyon, for an improved frame for manufacturing ornamented ribbons.

— Alexandre Crevel, of Paris, for improvements in the making of soap.

— François Soufflets, of Paris, for improvements in pianos.

— Gabriel Didier Fevre, of Paris, for the composition of a gasegenous substance for making gaseous liquors.

— Nicolas Bourguin, of Paris, for an apparatus for assisting children and invalids in walking.

— Louis Leroy, of Ivry, for a process of bleaching woollen fabrics.

— Jean Nicolas Obriet, of Paris, for an improved hydraulic machine.

— Jean Baptiste Laville, of Paris, for improvements in the manufacturing of hats.

— Delcambre, of Paris, for an improved apparatus for the sweeping of streets.

— Nicolas Martin, of Paris, for improvements in coaches and carriages.

— Louis Puget, of Paris, for a new kind of comb, which supersedes the use of hair pins.

— Hivert, Vautier, and Brocart, for an apparatus for drying paper, as it is manufactured, in a continuous sheet.

— Louis Romilly, of Paris, for an apparatus for manufacturing mineral waters.

— Louis Touchard, of Mans, for an improved gun.

— James Gallafent, of Paris, for an improved floater, applicable to steam generators.

To Brown, sen., and Germain Carpreau, of Beauvais, for improvements in the bobbin-net frame.

— Isaac Haag and Mazoir, of Puteaux, for improvements in the printing of calico.

— Benoit Conchon, of Volvic, for a machine for sharpening scythes.

— François Trupheme, of Marseille, for the construction of shutters and blinds with zinc.

— Henri Brewer, of London, for a machine for cutting paper.

— Alexandre Adrien Despreaux, of Paris, for improvements in the manufacturing of ornamented pasteboards.

— Prosper Auguste Artaud, of Paris, for a new method of locking the wheels of stage coaches.

— Felix Joandet, of Mont de Marsan, for a new kind of wheel for coaches and carriages.

— Philippe Gagin, of Vaugirard, for a new method of dissolving caoutchouc.

— Joseph Pierre Lebrun, of Paris, for improvements in mechanical lamps.

— François Joseph Labausse, of Paris, for improvements in pianos.

— Cattaert, Brothers, for the construction of a crystal branch, to be used with either wax, candles, or oil lamps.

— Galleur, Moullet, and Fournier, for an improved brushing machine for brushing woollen cloth.

— Nicholas Charroy, for an apparatus for registering the number of persons which enter into public coaches.

— Jules Auguste Huc, of Paris, for a process of manufacturing brushes with Spanish rush.

— Etienne Chaix, of Toulon, for a means of preventing incrustations in steam generators.

— Fargue and Ledoux, of Paris, for a new shoe and boot last.

— François Cavé, of Paris, for a machine receiving its motion direct from the steam, and calculated to supersede the use of the rammer, and other the like machines.

— Charles André Burchard, of Paris, for a pulverising apparatus applicable to the washing of ashes.

To Louis David Allégre, of Bordeaux, for the application of steam boats to sea fisheries.

— Pierre Paul Boucheron, of Paris, for a new pomatum for promoting the growth of hair.

— Barthelemy Laurence, of Grace Dieu, for an improved apparatus for extracting the syrup from beet-root.

— Garnot Gaboche, of Dunkirk, for an improved mill for grinding flour.

— Nallet and Collavon, of Marseille, for improvements in steam engines.

— Auguste Pasquier, of Paris, for an odontalgic extract.

— Louis Michel Julien Chambon, of Alais, for a new process for doubling and milling silks.

— Lentrier Piednoir, of St. Omer, for a process for extracting the juice from the pulp of beet-root.

— Gueneau, father and son, of Casnes, for a press for extracting the juice of beet-root.

— Pouein, Spyns and Co., of Bourbourg, for an apparatus for filtering the juice of beet-root.

— Furet Amedée Marlette, of Beauvais, for a new kind of espagnolette for the fastening of windows.

— Lagache Lecherf, of Lille, for a new method of refining the juice of beet-root.

— Claude Bourget, of Lyon, for a machine for transferring goods from one boat to another.

— Felix Richard, of Lyon, for a new pen-holder with ink reservoir.

— Barthelemy Champagne, of Lyon, for a new method of dressing plain or figured satins.

— Jaques Etienne Feuillâtre, of Paris, for a new close-stool, free from any emanation.

— Madame Martin, of Paris, for a new kind of embroidery with whalebone.

— Jean Claude Mirabel, of Lyon, for a new batten, called by him bat.ant lanceur.

(*To be continued.*)

List of Patents

Granted in Scotland between 22nd August and 22nd September, 1837.

To Lemuel Wellman Wright, of Sloane-terrace, in the parish of St. Luke, Chelsea, and county of Middlesex, engineer, for an invention of certain improvements in machinery or apparatus for bleaching and cleaning linens, cottons, and other fibrous substances.—28th August.

— Archibald Francis Richard Rosser, of New Boswell-court, in the county of Middlesex, esq., in consequence of a communication made to him by a certain foreigner residing abroad, for an invention of improvements in preparing manure, and in the cultivation of land.—1st September.

— John George Hartley, of 11, Beaumont-row, Mile End-road, in the county of Middlesex, esq., for an invention of an improved application of levers for the purpose of multiplying power.—1st September.

— James Hunter, of Ley's Mill, Arbroath, in the county of Forfar, mechanic, for an invention of a machine for boring or perforating stones and other substances.—4th September.

— Henry Stephens, of Charlotte-street, in the parish of St. Marylebone, in the county of Middlesex, gentleman, and Ebenezer Nash, of Buress-street, in the parish of St. George-in-the-East, and county of Middlesex, tallow chandler, for an invention of certain improvements in manufacturing colouring matter, and rendering certain colour or colours applicable to dyeing, staining, and writing.—6th September.

— Thomas Hancock, of Goswell-mews, Goswell-road, in the county of Middlesex, waterproof cloth manufacturer, for an invention of an improvement or improvements in the process of rendering cloth and other fabrics partially or entirely impervious to air and water, by means of caoutchouc or Indian rubber.—8th September.

— Henry Vere Huntley, of Great Russell-street, in the county of Middlesex, lieutenant in the Royal Navy, for an invention of improvements in apparatus for facilitating the securing of ships' masts.—15th September.

New Patents

SEALED IN ENGLAND,

1837.

To William Armstrong, junior, of Hawnes, in the county of Bedford, farmer, for his invention of improvements in ploughs.—Sealed 28th August—6 months for inrolment.

To John Joseph Charles Sheridan, of Ironmonger-lane, in the city of London, chemist, for his invention of improvements in the manufacture of soda.—Sealed 31st August—6 months for inrolment.

To John Hanson, of Huddersfield, in the county of York, leaden pipe manufacturer, and Charles Hanson, of the same place, watch-maker, for their invention of certain improvements in machinery or apparatus for making or manufacturing pipes, tubes, and various other articles, from metallic and other substances.—Sealed 31st August—6 months for inrolment.

To James Neville, of Clap Hall, near Gravesend, in the county of Kent, civil engineer, for his invention of certain apparatus or furnace for economising fuel, and for more effectually consuming the smoke or gases arising therefrom, the same being applicable for the generation of steam, and for heating or evaporating fluids.—Sealed 31st August—6 months for inrolment.

To William James Gifford, of Gloucester-place, in the county of Middlesex, surgeon, for his invention of improvements in paddle-wheels.—Sealed 7th September—6 months for inrolment.

To Henry Vere Huntley, of Great Russell-street, in the county of Middlesex, lieutenant in the Royal Navy, for his invention of improvements in apparatus for facili-

tating the securing of ships' masts.—Sealed 7th September—6 months for inrolment.

To Thomas John Cave, of Rodney-street, Pentonville, in the county of Middlesex, gentleman, for his invention of a great improvement in the construction of paddle-wheels applicable to ships, boats, and vessels of all descriptions propelled by steam, or other mechanical power.—Sealed 14th September—2 months for inrolment.

To Edmund Shaw, of Fenchurch-street, in the city of London, stationer, for an improvement in the manufacture of paper, by the application of a certain vegetable substance not hitherto used for that purpose, being a communication from a foreigner residing abroad.—Sealed 14th September—6 months for inrolment.

To Richard Davies, of Newcastle-upon-Tyne, and Robert Chrissop Wilson, of Gateshead, in the county of Durham, earthenware manufacturers, for their invention of an earthenware tile, slab, or plate.—Sealed 14th September—6 months for inrolment.

To Nevil Smart, of Bridge-wharf, Hampstead-road, in the county of Middlesex, wharfinger, for his invention of certain improvements in preparing the materials for making bricks, which improvements are also applicable to other purposes.—Sealed 21st September—6 months for inrolment.

To Samuel Cowling, of Bowling, in the parish of Bradford, in the county of York, barber, for his invention of improvements in raising water, applicable to various purposes.—Sealed 21st September—6 months for inrolment.

To William Joseph Curtis, of Deptford, in the county of Kent, engineer, for his invention of an improved boiler, or apparatus, for generating steam.—Sealed 21st September—6 months for inrolment.

CELESTIAL PHENOMENA, FOR OCTOBER, 18[illegible] .

D.	H.	M.	
1			Clock after the ☉ 10m. 20s.
—			☽ rises 7h. 46m. M.
—			☽ passes mer. 1h. 2m. A.
—			☽ sets 6h. 5m. A.
2	10	58	♀ in conj. with the ☽ diff. of dec. 1. 21. N.
	11	48	♂ in conj. with the ☽ diff. of dec. 1. 45. N.
	12	32	♄ in conj. with the ☽ diff. of dec. 4. 24. N.
3	3	36	♂ in conj. with ♄ diff. of dec. 2. 38. S.
	5	9	♀ in conj. with ♄ diff. of dec. 3. 1. S.
	7	0	♀ in conj. with ♂ diff. of dec. 0. 24. S.
5			Clock after the ☉ 11m. 33s.
—			☽ rises 1h. 5m. A.
—			☽ passes mer. 4h. 26m. A.
—			☽ sets 7h. 42m. A.
	7	57	☿ in inf. conj. with the ☉
6	15	46	♃'s third satt. will im.
7	7	13	☽ in □ or first quarter.
8			Occul. m. in Capri, im. 10h. 58m., em. 11h. 34m.
10			Clock after the ☉ 12m. 57s.
—			☽ rises 4h. 26m. A.
—			☽ passes mer. 9h. 18m. A.
—			☽ sets 0h. 53m. M.
	6	39	♅ in conj. with the ☽ diff. of dec. 3. 24. N.
	16	46	♃'s first satt. will im.
11	2		☽ in Perigee.
	8	29	☿ in the ascending node.
12			Occul. 10 in Ceti, im. 7h. 1m., em. 8h. 2m.
13			Total eclipse of the *Moon*.
	8	32	First contact with Penumbra.
	9	31	First contact with dark shadow.
	10	31	First total immersion.
	11	17	Middle of eclipse and full moon.
	12	3	Last total immersion.
	13	3	Last cont. with dark shadow.
	14	1	Last contact with Penumbra.
	16	7	☿ stationary.
15			Occul. 3 in Arietis, im. 10h. 38m., em. 11h. 40m.
—			Clock after the ☉ 14m. 9s.
—			☽ rises 5h. 37m. A.
—			☽ passes mer. 0h. 38m. M.
—			☽ sets 8h. 16m. M.
	21	56	☿ in Perihelion.
16			Mer. R. A. 12h. 25m. dec. 1. 20. S.
—			Ven. R. A. 15h. 56m. dec. 21. 56. S.
—			Mars R. A. 15h. 30m. dec. 19. 36. S.
—			Vesta R. A. 22h. 41m. dec. 19. 2. S.
—			Juno R. A. 14h. 58m. dec. 7. 38. S.
—			Pallas R. A. 2h. 16m. dec. 19. 10. S.
—			Ceres R. A. 5h. 37m. dec. 19. 47. N.
—			Jupiter R. A. 10h. 49m. dec. 8. 35. N.
—			Saturn R. A. 14h. 59m. dec. 14. 52. S.
—			Georg. R. A. 22h. 28m. dec. 10. 27. S.
—			☿ passes mer. 22h. 43m.
—			♀ passes mer. 2h. 17m.
—			♂ passes mer. 1h. 51m.
—			♃ passes mer. 1h. 20m.
17	2	23	Pallas oppo. to the ☉ intens. of light 1.144.
18			Occul. C in Tauri, im. 7h. 25m.
19	16	53	♃'s fourth satt. will em.
20			Clock after the ☉ 15m. 7s.
—			☽ rises 9h. 4m. A.
—			☽ passes mer. 5h. 6m. M.
—			☽ sets 2h. 5m. A.
	18	53	☿ greatest elong. 18. 15. W.
21	9	56	☽ in □ or last quarter.
	22	26	♀ in Aphelion.
22	22		☽ in Apogee.
24	12	42	♃ in conj. with the ☽ diff. of dec. 2 45. S.
25			Clock after the sun, 15m. 49s.
—			☽ rises 1h. 53m. M.
—			☽ passes mer. 8h. 55m. M.
—			☽ sets 3h. 41m. A.
26	6	2	☿ greatest hel. lat. N.
	15	2	♃'s first satt. will im.
27	15	35	☿ in conj. with the ☽ diff. of dec. 1. 53. N.
	17	5	♃'s second satt. will im.
28			Sun ecl., invis. at Greenwich.
29	11	33	Ecliptic conj. or ● new moon.
30	0	43	♄ in conj. with the ☽ diff. of dec. 4. 35. N.
31	7	33	♂ in conj. with the ☽ diff. of dec. 3. 0. N.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR AUGUST AND SEPTEMBER, 1837.

1837.	Thermo. Hig.	Thermo. Low.	Barometer. High.	Barometer. Low.	Rain in inches.	1837.	Thermo. Hig.	Thermo. Low.	Barometer. High.	Barometer. Low.	Rain in inches.
August						Sept.					
26	70	37	29,85	29,79	,025	10	69	42	29,86	29,76	
27	60	32	30,09	30,03	,12	11	70	43	29,76	29,60	
28	63	30	29,98	29,73		12	61	39	29,68	29,42	,15
29	61	42	29,53	29,40	,175	13	65	39	29,25	29,09	,15
30	57	41	29,42	29,34	,6	14	60	40	29,50	29,23	,05
31	61	34	29,42	29,38		15	60	33	29,87	29,50	,0125
Sept.						16	60	29	29,94	29,89	
1	61	35	29,38	29,38	,0375	17	71	29	30,00	29,94	
2	63	37	29,52	29,38		18	67	52	30,04	29,95	
3	56	36	29,68	29,53	,0125	19	69	48	30,05	30,01	,0125
4	59	39	29,85	29,78	,075	20	69	50	29,98	29,87	
5	63	30	29,90	29,77		21	68	39	29,96	29,84	
6	62	32	29,94	Staty.		22	67	39	29,99	29,97	
7	65	36	29,90	29,77		23	61	41	30,07	30,02	
8	64	43	29,84	29,80	,2	24	60	35	30,19	30,12	
9	67	42	29,81	29,63	,025	25	60	31	30,21	Staty.	

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

THE

London

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CONJOINED SERIES.

No. LXVIII.

Recent Patents.

To JOHN BETHELL, *of Mecklenburgh-square, in the county of Middlesex, gentleman, for his invention of certain improvements in apparatus for diving and working under water, and inspecting from above, objects which are beneath the surface of the water.*—[Sealed 31st January, 1835.]

THIS invention is described as consisting, first, in several improvements in the diving apparatus or helmet and dress worn by the diver, and the mode of steadying him and the baskets or buckets used to bring up articles from below, against the action of the tide or current; secondly, in the mode or method of enabling the divers to converse with each other, and with the persons in the attendant boats or vessels above; thirdly, in protecting the divers or pearl fishers from sharks or other fish of prey; fourthly, in suspending the divers in cages or on

stages, to enable them to be moved over the surface of the bottom of a ship or vessel, or along the sides of walls of docks or piers, or other such places, where a footing cannot be obtained for the diver; fifthly, in illuminating the ground or objects under water by reflectors or mirrors directing the sun's rays upon the part required to be illuminated, and in the mode of supplying air to lamps burning under the water, for the purpose of more perfectly supporting combustion therein; sixthly, in an improved construction of portable diving bell, formed of air-proof and waterproof cloth or fabrics, protected by framework; seventhly, in an improved construction of single-action force pumps for supplying the divers or bells with air; eighthly, in the application of an hydraulic engine, similar in its action to an hydraulic press, where the expansive force of compressed water is exerted upon a piston in a cylinder, to obtain the required power to raise heavy weights or wrecks of ships or vessels sunk under water; and, ninthly, in the improved method of surveying and inspecting from above, objects which are beneath the surface of the water, by illuminating such objects, or the bed of the sea, and inspecting with telescopes or tubes, partially immersed in the water, to enable the persons above to see more distinctly below.

"My several improvements in the diving apparatus, or helmet and dress worn by the diver, and the means of steadying him against the action of tides or currents upon the air pipes, &c., and forming the first part of these improvements, consists in an improved mode of preventing the escape of the fresh air out of the helmet or dress, excepting through the proper exit pipe, and in the mode of letting out from the helmet, or getting rid of the foul air, or that exhaled from the lungs of the

diver; also in furnishing him with an extra weight attached to a cord or rope, to enable him to ascend or descend in the water at his own pleasure, without the aid of ladders or assistance from the persons in the attendant vessel above; and, further, in steadying the diver against the action of tides or currents upon the air pipes or tubes, and signal lines, by passing them through rings connected with a moored or steadying rope; and in an improved construction of diving helmet or hood, formed of India rubber, or air and waterproof cloth, and distended, if desired, by a skeleton framing, all of which improvements are represented by the several figures referred to in the accompanying drawings.

"Plate IV., fig. 1, represents a front and side view of the diver equipped with a dress and helmet, having some of my improvements adapted to it: *a*, *a*, is the helmet, formed of metal connected to the waterproof dress *b*, *b*, by rivets, and fitted with glasses, to enable the diver to see out of the helmet in the usual manner. The lower part of the dress *c*, is connected to the upper part *b*, after being put on, by tying them tightly one over the other with a cord passed round a metal hoop or ring at *d*, shown detached at fig. 2, and in section at fig. 3, the cord pressing the two parts of the dress into the angular recess formed in the hoop, and thereby making an air and water-tight connexion, by which means the escape of the fresh air out of the dress is prevented. The diver being supplied with air by a force pump, through the pipe *e*, in the usual manner, and the foul air is taken off by a short pipe placed on the inside of the helmet, shown by dots at *f*, in fig. 1, which pipe is open at one end to the interior or top part of the helmet; the lower end is connected to the short flexible pipe *g*, on the outside, extending sufficiently below the helmet

to enable the diver to place the mouth piece *h*, into the ends of pipes attached to air and waterproof bags, for the purpose of filling them with the exit superfluous and foul air when required to lighten, buoy, or bring up any part of a wreck or article, and to assist the divers in their operations under water; but which air bags are not new, and form no part of my invention. By this pipe *f*, the exit air is only allowed to escape. It will be seen by this method of preventing the escape of the fresh air and getting rid of the exit air, that the foul air must be first carried off, from its being lighter than the fresh air, it consequently rises to the top part, where it is first to escape; by this means, the diver has a much better supply of fresh air to breathe without its being mixed with that he has exhaled: *i*, *i*, are the usual weights placed upon the body of the diver, but which are not of themselves sufficient to overcome the buoyancy of the air in the helmet; *k*, is an extra weight placed in a pocket formed on the side of the dress, which, with the weights *i*, *i*, is sufficient to keep him below the water. This weight is connected to a cord or rope *l*, which is coiled round the cleet *m*, fixed to the dress when the diver is at work. When he wishes to ascend to the top of a wreck or any higher situation, he has only to take the weight *k*, out of his pocket, and drop it, when the buoyancy of the air in his helmet and dress will cause him immediately to rise in the water to the height desired, the diver uncoiling the cord or rope from the cleet as he rises: when he has arrived at the proper height, and has steadied himself against any part of the wreck, he proceeds to pull up the weight, winding the cord round the cleet, and places the weight again in his pocket, when he is free to walk about as before. When the diver wishes to descend into the hold

of a vessel, or down the sides of a wreck to a lower situation, the weight is to be again dropped, and as soon as it reaches the bottom the diver can pull himself down by the cord; the weight is then to be placed in the pocket, and the diver proceeds with his operations.

"Fig. 4, represents several divers at work on a wreck, with the attendant vessel containing the air pumps, &c. The diver at A, is in the act of rising, having dropped the weight *k*, and is unwinding the cord *l*, and letting it slide through his hands. The diver at B, has risen to the top of the wreck, and is in the act of drawing up the weight *k*. The divers at C, D, are at work on the wreck.

"In order to steady the divers against the action of streams or tides, and facilitating the delivery of the air pipes and signal lines to their movements, I adopt the following means:—*p*, *p*, is a steadying rope, extending from the attendant vessel to weights on the wreck, or at the bottom, or to mooring blocks or anchors; *q*, is another rope or line, having double rings or hoops lashed on to it at *r*, *r*, *r*; the rope *p*, passes through one set of these rings or hoops and the air pipes or tubes *e*, and signal lines through the other set, shown more particularly in the enlarged partial view at fig. 5. When the diver is about to descend, the steady rope *p*, is first passed through all the rings on one side of the rope *q*, and the air pipes *e*, and signal ropes through the other. The weight or mooring anchor of the steady rope is then cast overboard, and when at the bottom, the upper end of the rope is made fast to some part of the attendant vessel; the diver then descends, and, as he is going down the ladder *s*, the rope *q*, with its rings, is delivered out to his movements, at the same time the air pipes and signal lines are allowed to go overboard, the rings

sliding down the steady line *p*, into the position shown in fig. 4; and when the divers arrive at the bottom, the pipes and signal lines are free to slide through their rings or hoops as required; by these means, the air pipes and ropes are kept from entangling, and the divers released from the action of the current or tide upon them. The same effect may be obtained by rings furnished with hooks, by which they are to be attached to the rope ladder as the diver descends. Fig. 6, is a representation of one of these rings or hoops: *t*, is the ring through which the air pipes and signal lines are passed; *u*, the hook by which they are attached to the rope ladder.

"In order to steady the baskets or buckets in which articles are brought up from the action of tides or currents, and to facilitate their being raised or lowered, I use a moored steadying rope or line, and a ring or hoop affixed to the basket or bucket, which slides up and down the steadying rope as the basket or bucket is pulled up or let down by the persons in the attendant vessel. I would here remark, that I prefer supplying each diver with air from a distinct pump, and through a distinct air tube; and, when two or more divers are at work, to pass all their air pipes through another open pipe or casing of canvas, to keep them from entangling.

"Fig. 7, is a representation of one of my light helmets, formed of India rubber or other air and waterproof cloth, and may be distended, if required, by a slight skeleton framing of metal or other material, represented at fig. 8: *a*, *a*, is the framing which, in this instance, is formed of strips of thin sheet metal; *b*, *b*, is the hood or helmet; and *c*, *c*, the lower part of the dress, the pieces of cloth forming the hood and dress, being connected by air and water-tight seams in the usual manner of making water-

proof dresses: *d*, is the supply pipe for the air, and *e*, the exit pipe.

"My second improvement consists in the adaptation of speaking pipes or tubes, through which the divers can converse one with another, and with the person in the attendant vessel; such pipes or tubes being connected to the helmets, opposite the ears of the divers, and extending from one diver to the other, or from them to the persons in the attendant vessel; and are furnished at one end with a covering of membranous substance, such as bladder, through which the sound of the voice can be conveyed, at the same time preventing the air from passing. In fig. 1, *n*, *n*, represents the speaking pipe communicating from one diver to another, and is open at one end to the interior of the helmet of one diver, and the other end is also open to the interior of the other helmet opposite the ear of the other diver, but is covered with bladder, through which the sound of the voice of one diver can be heard by the other. The pressure which this bladder has to withstand is only that occasioned by the difference between the depths the divers are at, each diver being supplied by a separate force pump and air pipe, consequently, the density of the air in their helmets is according to the different depths they are below the surface of the water; and it is the pressure caused by this difference of density only that the bladder has to withstand: *o*, *o*, is the speaking pipe leading from one of the divers to the boat or attendant vessel; the upper end of this pipe must be covered with bladder of sufficient strength to withstand the pressure, according to the depth the diver is below the surface of the water; this pipe is to be supplied with a stop cock near the bladder, by which the person in the attendant vessel can prevent the escape of the air from

the helmet of the diver, in case of the bladder bursting, and such person above may be furnished with a hood to exclude external sounds if desired. I would here remark, that other membranous substances or flexible diaphragms may be used, but I prefer bladder, as being most convenient; and it will be evident that this mode of enabling the divers to converse one with another and with the persons above, may be also applied to divers in diving bells, by which they may converse with the persons in the attendant vessel above.

"My third improvement is shown in fig. 9, and consists in protecting the divers, where there is danger from fish of prey, by strong metal cages furnished with straps, to be passed over the shoulders, by which the divers can lift and carry them from one place to another; and air bags, to be filled from the exit pipe of the helmet, so as to buoy up or lighten them. These cages are lowered from the attendant vessel with the divers. The air bags are furnished with short flexible pipes with bell-shaped mouth pieces, hanging down inside the cage to about the level of the diver's breast, by which they are filled with the exit air by the diver, and are fastened to the top part of the cage in any convenient manner, and have valves at the top, by which the diver can allow the air to escape when requisite, the valves being furnished with cords passing from the tail of the valve through the pipes. The divers shown at fig. 9, represents pearl fishers, who receive their supply of air through two distinct pipes. The diver at A, is at work, the air bag of his cage being empty; the diver at B, has filled his bag with as much air as will buoy up or lighten the cage sufficiently for him to carry it about. Fig. 10, represents one of these bags detached.

"My fourth improvement, viz. that of suspending

divers for the purpose of working under water, is shown in figs. 11, and 12. Fig. 11, represents a sketch of a cage with a diver at work cleaning a ship's bottom; the cage is formed of pieces of metal, which may be jointed one to another, so as to allow its being accommodated to suit the shape of the side or bottom of the vessel, and is furnished with small rollers or wheels to facilitate its being moved from one part to another. The diver rests himself on the cage or frame, and is suspended by chains or ropes extended from one side of the vessel, and is kept in contact with the bottom by other ropes or chains passed under the keel and up the other side of the ship to the deck. The frame or cage is passed over the surface of the bottom of the vessel by the persons on deck moving it about as required by the diver: *a*, is the cage or frame; *b*, *b*, the chains and ropes by which it is suspended; *c*, the rope or chain for keeping it in contact with the side or bottom of the vessel; *e*, is a rope extending from the head and stern of the vessel to steady him against the tide or currents. The diver should be supplied with a lamp capable of burning under water, as hereinafter described. In fig. 12, the diver is represented working, suspended at the side wall of a dock or pier. The diver is placed on the frame or platform *a*, and suspended by a chain or rope from the crane *b*, mounted in the carriage *c*, which must be weighted so as to counterbalance the diver and cage, and should also carry the air pump to supply the diver, the carriage being moved along the walls as required; or he may be suspended from a boat or raft, if more convenient.

"My fifth improvement consists in illuminating objects under water by reflectors, directing the sun's rays to illuminate objects under water, or by lamps, supplied with air in the manner hereinbefore described.

Fig. 13, exhibits the manner of using reflectors or mirrors to direct the rays of the sun to a particular spot, or to illuminate the wreck or part where the divers are at work. The reflectors should be mounted in proper adjustable frames, placed in the attendant vessel or boat: *a*, *a*, are the reflectors, placed in the adjustable frame *b*, *b*, the persons attending and adjusting the reflectors are furnished with dark glasses or spectacles to enable them to look into the mirrors, and also with telescopic tubes *c*, with hoods, to exclude the rays of light from their eyes; these tubes being partially immersed in the water will greatly facilitate their seeing what is going on below. Fig. 14, represents a section of a lamp intended to be used under water, with my improved mode of supplying air to support combustion applied to it: *a*, *a*, is a bell-shaped glass case, which is securely fastened air and water-tight to the bottom part or stand *b*; *c*, is the lamp. The air to support combustion is admitted from the force pump through the pipe *d*, into the hollow part of the stand *e*; and from thence it passes through channels or spaces *f*, *f*, formed round the lamp, and escapes into the glass case close round the wick, by which means the fresh air is always brought immediately in contact with the wick, and may be furnished with a chimney glass *i*, if thought desirable. The exit air escapes by a pipe *g*, with a bell-shaped mouth piece, open at one end to the interior of the upper part of the bell glass, and the other end is conducted through the stand, where the air escapes; *h*, is the part for looking out and putting in the lamp, which is screwed water-tight into the bottom of the stand; *k*, *k*, is the handle by which it is suspended and let down from the attendant vessel.

"My sixth improvement, namely, that of constructing

portable diving bells of India rubber, or air and water-proof cloth or fabric protected by skeleton framing, formed of metal or other material, is shown in figs. 15, and 16. Fig. 15, is a side view of one of these diving bells, and fig. 16, is a vertical section of the same: *a, a, a,* is the metallic skeleton framing; *b, b,* the air and waterproof cloth; *c, c,* are the glasses, properly secured in the cloth, to admit the light and allow the divers to look out; *d, d,* are the chains or ropes by which the bell is suspended; the seats for the diver being formed by ropes suspended from the top part. The weights necessary to cause the bell to descend may be of iron, lead, or stone, as most convenient or at hand, and should be fastened round the bottom part of the framework at *e*; *g, g,* is the supply pipe for the fresh air, which is connected to the pipe *h, h,* extending round the inside of the bell, and has a number of small holes pierced in it, through which the air escapes into the bell; the exit and foul air is taken off by the pipe *i, i,* one end of which is open to the interior of the bell at the top, and the other end is open for the escape of the exit air below. The lower end of the pipe *i,* should always be a little above the bottom part of the bell, in order that the air may escape easier by the pipe than under the sides of the bell. If it should be thought desirable, the bell may be further protected and strengthened by a gauze or net-work of wire or cords placed within the metal framing; or the framing itself may be formed of wire net-work, in segments, to render it portable, so as to be put together when wanted; and, if desirable, the bells may be furnished with air bags to be filled by the divers, in order to allow of their being carried about by them, such bags being furnished with pipes passing through the air and waterproof cloth by an air and

water-tight connexion, and having stop valves on their ends. The bags are also furnished with valves at the top, to allow the air to escape when requisite. In fig. 16, is represented a section of one of these air bags: *k*, is the bag; *l*, the pipe by which the bag is filled with air by the diver in the bell; *m*, the stop valve at the end of the pipe; *n*, the top or escape valve, which is opened by the diver pulling the wire *o*, placed in the valve *m*, and thereby pulling the cord *p*, which is attached to the wire *o*, and tail of the valve *n*. The framing should be fastened together by screw nuts and bolts, so that it may be readily taken to pieces when required.

"The object of my seventh improvement is, to obtain a more constant or continuous stream of air from a single-action force pump, than can be obtained by those of the common construction, and is shown in the vertical section of the pump at fig. 18: *a*, is the cylinder of an ordinary single acting pump; *b*, the piston, working in the cylinder and connected to the rod *c*, which is attached to the lever *d*, having its fulcrum on any part of the framework of the pump; *e*, is the valve to admit the air into the cylinder; and *f*, is the foot or exit valve. This pump is worked by forcing up and down the lever *d*, precisely in the way of working common single-action pumps, my improvement being the application of the air, regulating chamber and apparatus, which I shall now describe:—

"The air, as it is forced from the cylinder *a*, at every down stroke of the piston, passes through the foot valve *f*, along the passage *g*, into the chamber *h*. This chamber is furnished with an air-tight flexible bag or diaphragm *i*, securely fixed, air-tight, round its edges at the flanges *k*, and divides the lower part of the chamber *h*, from the upper part *l*. Previous to working the pump,

the upper part of the chamber *l*, contains air of the common atmospheric pressure, or of a greater density if required; but when the pump is set to work, and the diver is descending, the air in the chamber *h*, increases in density, and the air in the upper part of the chamber *l*, becomes compressed, the flexible diaphragm giving way to the pressure of the infected air; and, as at each up-stroke of the piston, there is a cessation of the injection of air from the pump into the chamber *h*, at this time the elastic force of the compressed air in the upper part of the chamber at *l*, acts upon the flexible diaphragm, and, expanding in volume, expels the air from the lower part *h*, until the next down-stroke of the piston, when a re-action takes place. By these means, the elastic force of the compressed air above the diaphragm acts alternately upon that below, and thereby keeps up a more continuous stream than can be obtained by a single-action pump of the ordinary construction.

"My eighth improvement, viz. the application of hydraulic engines to raise heavy weights or wrecks of sunken ships or vessels, or drawing up piles from under water, is shown in fig. 19: A, A, represents sections of two buoyant vessels properly strengthened internally by timbers; B, represents a wreck of a ship or sunken vessel; C, C, are the cylinders of two hydraulic engines, in which water is forced by pumps in the manner of the common hydraulic press, the expansive force of the compressed water being exerted upon a piston attached to the rods and cross heads D, D, moving in parallel guides F, F; to these cross heads, strong chains G, G, are attached, which are passed through tubes, trunks, or pipes H, H, the lower ends of which protrude through the bottom of the vessel, and are open to the water:

the chains G, G, are attached to other chains I, I, passed round the wreck or other heavy weight. These chains may be further secured and fastened by a number of screw bolts to the vessel; there are stoppers at K, K, which are made to take hold of the chains as soon as the piston has arrived at the top of its up-stroke, and retain them while the pistons and cross heads are descending to take hold of a fresh length of chain; which operation is repeated until the weight is brought to the required height; by these means, the wreck or other heavy weight may be raised up to the buoyant vessels, when they may be floated or towed into harbour or shallow water. It will be evident that the same power may be applied to draw up piles, or remove other obstructions. And, I would here remark, that I propose to assist the raising such vessels and wrecks by screwing into their sides, screw bolts with ring-heads, such as represented in fig. 20; and to attach to such bolts, air-proof bags, casks, or cases of metal or wood, by hooks fastened to them, which bags, casks, or cases are to be filled with the exit air from the diver's helmet; but such air-proof bags, casks, or cases are well known, and form no part of my invention.

"My ninth and last improvement, viz. in the method of surveying and inspecting from above, objects which are beneath the surface of the water, consists in illuminating the bottom or bed of the sea, or the wreck of a vessel or particular spot, by reflectors directing the sun's rays, or by sunken lamps or lights, in the manner hereinbefore described, and in inspecting and surveying from above, the bed of the sea or the objects so illuminated through open tubes or trunks, partly immersed in water, to prevent the ripple on the surface interfering with the sight; into which tubes or trunks, telescopes

of the ordinary construction, may be placed: by these means the party surveying will be better able to distinguish from above, objects below the surface of the water. Fig. 21, represent surveyors at work in a boat: *a*, is the light lowered by the rope *b*, on to the bottom or bed of the sea; *c*, is the air supply pipe; *d*, the tube partly immersed in water to prevent the ripple of the surface interrupting the view, and into which the surveyor places his telescope, or when used without a telescope, the top of this tube should be furnished with a hood fitting the face, to exclude the glare of light."—[*Inrolled in the Rolls Chapel Office, July,* 1835.]

Specification drawn by the Patentee.

To Frederick Burt Zincke, *the younger, of Crawford-street, Marylebone, in the county of Middlesex, Esq., for his invention of the preparing or manufacturing of the leaf of a certain plant so as to produce a fibrous substance not hitherto used in manufactures, and its application to various useful purposes.*—[Sealed 9th December, 1836.]

This invention relates to preparing the fibrous parts of the leaf of the pine-apple plant, and rendering the same applicable to the various purposes for which hemp, flax, tow, cotton, and other fibrous substances are now used.

The invention is stated to consist, first, in operating upon and preparing the leaf of the plant so as to separate the fibrous parts thereof from the cuticle pabulum, or other matters of which the leaves are composed; and the application of the fibres so prepared to the making of linens, cambrics, shawls, and other woven fabrics or piece goods; and also to the making of ropes, cordage, string, thread, paper, &c.

The Patentee recommends that the leaves be gathered between the time they attain their full growth and the ripening of the fruit; for he finds that if the leaves are gathered before this time, the fibrous parts are not so strong, and if allowed to remain long upon the plant after the fruit is ripe, the fibres become more brittle, and the extraneous parts adhere with much more tenacity to them, and are, consequently, more difficult to free therefrom, and also the cleansing or bleaching is more difficult to effect.

The process described, in order to prepare the fibres and separate them from the other parts of the leaf, is as follows:—The leaves being gathered from the plant, are to have the small prickles around their edges removed with a sharp knife or other cutting instrument; they are then to be beaten, crushed, or bruised upon a wooden block with a wooden mallet, until the fibrous parts are separated from the extraneous matters, and appear as a mass of silky fibrous material, which is then to be well washed or rinsed in soft water, so as to remove the green matter mixed up with and adhering to the fibres; they are then to be drawn through two p eces of wood (under a slight pressure), so as to squeeze out the water, care being taken to keep the fibres as straight as possible throughout the whole operation.

If it should be found that the extraneous matters are not completely removed from the fibres, the process of washing may be repeated, or they may be boiled in an alkaline solution (as soap and water) for some hours, according to the state of the fibres; and this latter process will be found more desirable, when the leaves have not been gathered at the proper time, or after the fruit has ripened.

When the fibres are subjected to the boiling process,

they are to be laid straight in the vessel, and a light weight or grating placed upon them so as to keep them covered by the solution, and from being boiled up into an entangled mass. After the fibres have been properly laid in the vessel, the alkaline solution is to be poured in, and the whole boiled from four to six hours, or more, according to the state of the fibres. After this they are to be well washed or rinsed, to free them from the alkaline solution, and then hung up to dry in the shade, the fibres being shaken frequently to prevent them adhering together more than can be helped; and when dry they will have the appearance of a mass of white silky fibres, although, in fact, every fibre is a bundle of fibres of exceeding minuteness, and in this state the fibrous material is in a condition to be applied to the various purposes above stated.

The second part of the invention consists in the application of the above-named fibrous substance to the purposes for which flax, hemp, cotton, silk, or such other materials are now used; and when they are intended to be spun into threads or yarns, they are to undergo the process of bleaching, after the usual manner of treating flax.

This is stated by the Patentee to be best effected when the fibres are in the state of rovings, as the bleaching process further separates the fibres, and allows the roving to be elongated between the delivering and drawing rollers of the spinning frame; and for coarse yarns the first of the usual process of bleaching will do; but when it is intended to make an exceedingly fine yarn or thread, the bleaching is to be repeated or carried out to a greater extent.

The claim of invention is stated to be as above; preparing the fibrous parts of the pine-apple plant and the

application or use of the same to the various purposes for which flax, hemp, tow, silk, and other fibrous substances are now used.

The adaptation of this material appears to us to be a very important discovery; we have seen some specimens of cambric both in the bleached and unbleached state, said to be manufactured from this pine-apple fibre. It is of a finer texture than any we have ever seen made from flax, and exceedingly strong; but that specimen of the cambric made from this material which has been examined by us, is formed by strands of fibres *not twisted or spun*, the separate strands being, we presume, in the simple state they were left after the above described process of cleaning, and merely joined together at their ends apparently by adhesion, in order to constitute such lengths as would be adapted for the warp and weft of the fabric. Each strand of fibres is really, as the Patentee states in his specification, a bundle of longitudinal fibres of extreme minuteness adhering together, for on examining the fabric by a powerful microscope, from 150 to 200 distinct fibres may be counted in one strand, standing parallel and straight.

It appears from the specification that the Patentee confines himself to the employment of the pine-apple plant (bromelia ananas) alone, though it is obvious that the whole of the system (bromelia) are of nearly the same fibrous character. If the other plants are applicable to the same purposes, they should have been stated so to be, for in the absence of such statement, they are left open to the public use.—[*Inrolled in the Inrolment Office, June,* 1837.]

To Robert William Sievier, *of Henrietta-street, Cavendish-square, in the county of Middlesex, gentleman, for his invention of an improvement in the means of dissolving and preparing caoutchouc or India rubber for various purposes.*—[Sealed 27th February, 1836.]

This invention consists in dissolving or separating the elastic gum caoutchouc or India rubber by means of alkali in the following manner:—

Take caoutchouc or India rubber, cut into small pieces, and put them into any convenient vessel that may be closed at the mouth; then fill the vessel with liquid ammonia so as to entirely cover the India rubber, and in a few months it will be dissolved, or its particles separated.

After such dissolution, put the solution so made into a still or large retort, and by the application of heat nearly the whole of the ammonia may be distilled over in a gaseous form, and may be taken up in the usual way, by cold water; in which state it again becomes liquor ammonia. In this operation of distillation, it is preferred to use a water bath, as the India rubber by that means cannot be subjected to a heat of more than 212 degrees of Fahrenheit. The ammonia assumes a gaseous form at 130 degrees.

On separating the ammonia by distillation, as above, the India rubber is left held up in the water, and in that state may be applied for water-proofing cloths, or in making solid masses of any form.

By subjecting this solution to evaporation, any degree of consistency may be given to it, by increasing or diminishing the quantity mixed with the previous dissolved India rubber.

The Patentee concludes, by saying, "Having de-

scribed my improvements in the means or process of dissolving or separating the particles of caoutchouc or India rubber from each other, and preparing it for various purposes, I desire it to be understood that I claim, as my discovery or invention, the use or application of ammonia to effect the solution or separation in the manner herein described."—[*Inrolled in the Rolls Chapel Office, August,* 1836.]

To Miles Berry, *of the Office for Patents, Chancery-lane, in the county of Middlesex, engineer and mechanical draftsman, for new or improved apparatus or mechanism for marking down or registering the notes played on the keys of piano-fortes, organs, or such other keyed musical instruments, being a communication from a foreigner residing abroad.*—[Sealed 12th April, 1836.]

This is a piece of mechanism to be attached to a piano-forte, or other keyed musical instrument, by means of which every note produced by the depressions of the keys of the instrument as they are severally touched, will be marked upon a roll of paper placed upon a barrel below; and the barrel carrying the roll of paper, being made to revolve slowly by means of clock-work, (in accordance with the time of the subject played,) the marks left upon the roll of paper will be in such positions, and at such distances apart, as will clearly indicate not only every note which has been struck by the finger, but also the respective lengths of such notes; thereby affording the means of perfectly transcribing or translating the whole subject played into the proper forms of notes and musical passages as commonly ex-

pressed upon paper. By the use of this apparatus appended to a piano-forte or organ, it is intended that any extemporary subject played upon the instrument shall be preserved and recorded upon the roll so as to be copied in the ordinary musical characters.

By way of illustrating the construction of this apparatus, the Patentee has referred to the mechanism of an ordinary bird organ or hand barrel organ, in which pegs, upon a rotary barrel, act upon levers which open the apertures of the organ pipes, and thereby produce the sounds: this apparatus being of the same sort of construction, but reversed in its action; that is, whilst the pegs on the barrel in the former act upon the levers or keys of the instrument, the levers or keys in this apparatus act upon the barrel; or to explain this more clearly, the under part of each key, when it is depressed, strikes the end of a compound lever, and causes a point, as that of a pencil, to press upon the surface of the roll of paper, and thereby produce a mark upon the paper in a situation as to the width of the roll, corresponding with the particular key struck; and as the roll is progressively moving forward, the length of the mark will indicate the length of the note.

Plate V., fig. 1, represents one of the compound levers detached from the instrument; fig. 2, shows a series of these compound levers connected, or, as it would appear, attached under the key-board of a piano-forte: about one half only of the front of the piano, and consequently of the apparatus, being exhibited; fig. 3, is a section taken transversely through the middle of the piano-forte, in which the apparatus is represented in profile.

The ordinary keys of the instrument are shown at *a*, *a*, *a*; the inner side of each of which keys when

depressed acts upon an upright pin *b*, connected by a joint to one of the compound levers *c*, *d*, *e*, the lower end of this lever carrying a pencil or point intended to operate upon the surface of the paper extended over the barrel or roller *f*. Fig. 3, shows, in section, the roller *g*, upon which the roll of paper is in the first instance wound in one long sheet. This roller turns upon its axle, supported by arms. One end of the roll of paper is passed upwards as at *i*, *i*, over what may be called the bed roller or barrel *f*, and is thence conducted to the receiving roller *k*, to which the end of the paper is made fast. The bed roller or barrel *h*, being coated with soft leather, in order that the pencil or point, when pressed down upon the sheet of paper, may take effect.

The axle of the barrel *h*, is connected to spring clockwork, or what is called a going barrel *l*, and being thus made to revolve, carries the sheet of paper forward with it. The axle of the roller *k*, is mounted in lever arms, which are held up by springs, and, consequently, the periphery of this roller is kept in contact with that of the bed roller or barrel *f*, and is turned by it through the friction of the two surfaces.

The construction of the apparatus being now explained, it will be perceived that on the performer depressing any one of the keys *a*, the particular set of levers *b*, *c*, *d*, *e*, connected with that key, will be immediately acted upon and no others, and the point at the lower end of the operating lever *e*, being by that means forced down upon the paper extended over the barrel, a mark will be traced upon the paper answering to the note struck; at the same time the paper, with the barrel moving onward, the length of the mark made upon the paper will be in proportion to the length of

time the note is held by the performer, which will thereby show the proper length of the note struck, that is, whether it was a crotchet, a quaver, or note of any other length.

The Patentee next describes, at considerable length, the mode by which the marked roll of paper may be read off, which is, in the first instance, by drawing red lines at the several octaves down the whole length of the sheet of paper, and then marking the bars by lines drawn across the sheet, corresponding to the extent through which the barrel turned in one bar. This explanation, however, which necessarily involves a considerable detail, need not be repeated here, as its general features will be obvious to every reader who is but slightly acquainted with music and the art of writing it.—[*Inrolled in the Rolls Chapel Office, October,* 1836.]

To Benjamin Cook *and* James Cook, *of Birmingham, brass-founders, for their invention of certain improvements in beds and mattresses.*—[Sealed 31st January, 1835.]

This invention consists in making the framework of the bed, or, we should rather say, the bedstead, of iron, and of constructing it in such a manner that it may, with the mattress, be folded up into a small compass, and thereby rendered portable. This framing has drawers beneath, and pockets inserted in the mattress, for the purpose of holding any articles that may be desired, such perhaps, as the bed linen and blankets.

Plate V., fig. 4, represents a plan or horizontal view of the framing of the bedstead without the mattress;

a, a, and *b, b,* forming the side rails, and *c,* and *d,* the head and foot rails; *e,* and *f,* are rails for the purpose of connecting the side rails *a, a,* and *b, b,* together, so that it will be perceived that the bedstead is formed or constructed of two distinct oblong framings, connected together at *g,* by hinge joints, for the purpose of folding up when it may be necessary so to do.

Stumps *h, h,* are placed at each corner of the bed, for the purpose of keeping the mattress steady, and also for supporting the bedpost, which screw on to the tops of the said stumps. The mattress also consists of two parts, as will be seen by reference to fig. 5, which represents a side elevation of the bedstead with the mattress upon it: *i, i,* is the sacking or webbing, which must be sewed on to the side and end rails, or attached to them in any other convenient manner, which will be readily understood by any upholsterer.

The Patentees observe, that head rails may be applied to the bedstead for hanging the curtains and tester; and that they may also be jointed, in order to fold up when required. The drawers are placed under the mattress, and made to slide between the legs of the bedstead; and the "pockets" are made in the under part of the mattress, and are opened and closed much in the same manner as the pockets of portmanteaus.

In conclusion, the Patentees state, that they do not intend to claim any of the parts separately, nor do they confine their claim of invention to constructing the framing of the bedstead with one joint only, as represented in the drawing, as it is evident that more joints may be advantageously employed; but, that they claim the arrangement herein set forth, in which the framing of the bedstead is made to constitute a framing for the mattress.—[*Inrolled in the Inrolment Office, July,* 1835.]

To John Smith, *of Bradford, in the county of York, machine maker, for his invention of a certain improvement on chisels or instruments for cutting stone and certain other substances.*—[Sealed 23d December, 1834.]

The Patentee commences his specification by observing, that the ordinary chisels used for cutting and dressing stone, and also for cutting and dressing cast-iron, very soon become blunted and unfit for use, and, therefore, frequently require sharpening; which is an operation requiring time and judgment, and in situation, where a forge is at some distance, occasions much inconvenience and delay, as the chisels have first to be forged and sharpened, and then to be properly hardened and tempered. Now, the object of this invention is, to avoid the necessity of continually sharpening chisels, in order to effect a considerable saving of time and expense.

The manner in which the Patentee proposes to do this, is to substitute a thin plate of steel, properly tempered, to answer the purpose of the cutting edge of the ordinary chisels, which thin plate of steel is to be placed between two cheeks made of iron and case-hardened; these are to be securely and rigidly held together by any convenient means, but in such manner that, as the steel wears away, the plate may be brought forward between the cheeks.

The Patentee has shown in the drawing accompanying his specification, the manner in which he carries this into execution. Plate V., fig. 6, represents a side-view of a chisel manufactured according to the Patentee's invention; the thin plate *a*, is to be of properly tempered steel, and held between two cheeks *b*, and *c*. In the interior of the two cheeks there is formed a

female screw, shown by dotted lines in the figure, so that when the steel plate *a*, is in the chisel-holder, it separates or divides this female screw into two parts; the upper parts of the two cheeks or chisel-holder are connected together by what the Patentee calls a mortice, and prevented from slipping sideways by studs, which are formed on the interior face of the cheek *b*; which studs take into recesses in the other cheek *c*. The lower part of the cheeks are held firmly together, and rigidly retain the steel plate in its proper position by means of a socket *d*, which is forced up the cheeks, and thus securely holds them, as they are formed of a wedge shape: for this purpose a wedge, or cotter *e*, is driven through two holes made in the socket *d*, taking into a recess formed on the cheek *b*; this cotter is for the purpose of preventing the socket from being shook off the cheeks by the blows to which the chisel may be subjected: *f*, is a round knob screwed on to the top of the chisel, to receive the blows from the mallet.

Having thus described the construction of the chisel, the Patentee next proceeds to inform us in what manner it is put together and used. When the steel plate is placed between the two cheeks, a male screw is inserted into the top of the chisel-holder, and screwed down tight into the upper end of the steel plate, for the purpose of preventing it from receding when a blow is struck; when that portion of the steel which is exposed below the cheeks, at *g*, is worn away, and it may be necessary to advance a further portion, the wedge or cotter *e*, is to be knocked out, and the socket is forced off the cheeks by applying a few blows to the knob *h*, the cheeks will then be loose, and the steel may be advanced by inserting a key or screw-driver into the top of the chisel, and screwing the male screw down,

which forces out the steel. This operation being performed from time to time until all the steel plate is used, another must be inserted in the same manner.

Having thus described his invention, the Patentee states, that he does not intend to claim any of the parts separately, of which the chisel is composed, but only the whole combined, by which he constructs "an instrument for holding the plate of steel, and which plate of steel may be propelled gradually as it is worn away, and yet when in use it is held rigidly and firmly, and prevented from receding from its work by the male screw, as above described."—[*Inrolled in the Inrolment Office, June*, 1835.]

To WILLIAM BRYANT *and* EDWARD JAMES, *of Plymouth, in the county of Devon, merchants, and co-partners, being of the people called Quakers, for their invention of improvements in the manufacture of liquid and paste blacking, by the introduction of India rubber, oil, and other articles and things.*—[Sealed 3d December, 1836.]

THE Patentees describe their invention of an improved paste or liquid blacking as consisting in introducing a solution of India rubber or caoutchouc, for the purpose, we suppose, of making the blacking in a degree waterproof. The manner of making the solution of India rubber for this purpose, is described in nearly the following words:—

The India-rubber oil which is used, consists of about eighteen ounces of the caoutchouc, a little more or less, according to the quality of the India rubber, which is dissolved in nine pounds of rape oil, by heat; take

this solution, and add to it sixty pounds, by weight, of fine ivory black and forty-five pounds of molasses, add to these one pound of finely pulverised gum arabic, dissolved in twenty gallons of vinegar; the No. 24 vinegar is to be preferred.

The above ingredients are to be carefully mixed and ground in a mill, adapted for the purpose, until the mixture becomes perfectly smooth; twelve pounds of sulphuric acid is then added, in small quantities at a time, and the whole is stirred briskly for half an hour.

The blacking thus produced is allowed to stand fourteen days, it being stirred for half an hour every day: three pounds of finely pounded gum arabic is then added, and the stirring is kept on for half an hour each day, for fourteen days longer, when the liquid blacking will be fit for use.

For making the paste blacking, the Patentees first take a quantity of the India-rubber oil, consisting of the same ingredients, and mixed in the same proportions as that above described, and add to it sixty pounds, by weight, of fine ivory black, with about forty-five pounds of molasses, and a quantity of very finely powdered gum arabic, which must be dissolved in twelve pounds of vinegar, of the No. 24 strength; no specific quantity of gum arabic being mentioned, we presume the Patentees intend one pound to be used; thus making the difference in the liquid and paste blacking only to consist in the quantity of vinegar.

When the gum arabic is added, the whole of the ingredients are to be well mixed and ground in a mill, until the paste becomes perfectly smooth; after which, add gradually, and in small quantities at a time, twelve pounds of sulphuric acid, care being taken that the mixture is briskly stirred, during the operation of pour-

ing in the acid, and for about half an hour after the whole of the acid has been added; this mixture will be found fit for use in about seven days.—[*Inrolled in the Inrolment Office, February*, 1837.]

To JEAN MARIE ETIENNE ARDIT, *of Newman-street, Oxford-street, in the county of Middlesex, printer, in consequence of a communication made to him by a certain foreigner residing abroad, for a machine or apparatus for drawing, and for copying and reducing drawings and other objects or subjects, and for taking panoramas.*—[Sealed 10th August, 1831.]

THIS invention relates to an instrument employed for drawing perspective by mechanical means, called a *diagraphe.* The instrument is placed on a table, and the eye of the artist being applied to a certain part of the instrument, he views from thence the object intended to be drawn; and by means of a string passed over pulleys, moves a bead or a point over the apparent outlines of the object, by which means a pencil below is made to trace the same form upon a sheet of paper laid flat upon the table. The subject of the present patent, is an improvement upon the ordinary diagraphe; but it is so very obscurely described in the specification, though at considerable length, that we confess our inability to comprehend in what the invention consists, any further than in adapting an upright rod to the original instrument, for some undescribed purpose.

The claim set out at the end of the specification, is in the following words:—

"Having now described the nature and construction of the invention, communicated to me from abroad, I

would have it understood, that I lay no claim to any parts that have been before known and in use; but I do claim the adaptation of the rod U, V, to the common diagraphe, as above described; and I further claim the arrangement of such parts as have not been heretofore used for drawing panoramas;" but which these parts are, and in what manner the machine or apparatus is used for that purpose, the Patentee does not inform us. —[*Inrolled in the Inrolment Office, October*, 1831.]

To WILLIAM BINGHAM, *of St. Mary Hall, in the city of Oxford, Esq., and* WILLIAM DUPE, *of the same city, gun-maker, for their invention of certain improvements in fire-arms of different descriptions.*—[Sealed 24th September, 1831.]

THIS improvement is described as applicable to muskets, fowling-pieces, pistols, and other fire-arms; its leading feature, or "principle," as the Patentees describe it, being that of firing the piece by percussion at the back of the breech. This "principle," if such we may call it, is not new, as most of readers are aware; (see Cook's patent, in our First Series, vol. ix. p. 297; Davis's patent, vol. xii. p. 251; Newmarch's patent, vol. xiv. p. 76; and several others subsequently;) and as to the mechanism of the lock, that appears to possess as little novelty.

The Patentees, after claiming the principle of firing by percussion, behind the breech, have enumerated the points of detail which they claim, under eight distinct heads:—First, countersinking the screw holes of the lock plate; second, the adaptation of a straight main spring; third, forming the trigger of one piece with the

sear; fourth, forming the hammer of one piece with the tumbler; fifth, placing the nipple at the back of the breech; sixth, firing behind, by a peculiarly formed breech; seventh, the enclosing the cock within a metal box or chamber; and eighth, the metal chamber or case.

These are the points which are considered by the Patentees to be new; they may be adapted to any kind of hand fire-arms; and, provided the lock, with the nipple, be enclosed within a metal box or case, the butt and the stock may be of any shape, and of wood or other material, as may be thought proper.—[*Inrolled in the Inrolment Office, March,* 1832.]

To WILLIAM HALE, *of Colchester, in the county of Essex, machinist, for his invention of improvements in machinery or apparatus for propelling vessels, which improvements are also applicable for raising or forcing fluids.*—[Sealed 13th October, 1831.]

THE subject of this patent appears to be a modification of the mode of propelling vessels on water, for which a patent was granted to Mr. Hale, dated 12th January, 1830. (See vol. ii. of our present Series, p. 22.) It consists in mounting a revolving propeller in an excentric position, within a box or case, the sides of which continually diverge, thus forming a convolute curve. The water is allowed to flow into this case through a central aperture formed round the axle of the propeller; and by the rotation of the excentric propeller, the water is expelled through a passage formed as a tangent to the box or case which is placed at the stern of the

vessel. The pressure of the water from the jet thus produced, acting against the surface of the water in which the vessel floats, constitutes, by its resistance, the means of propelling the vessel in the opposite direction.

Plate V., fig. 9, represents a section of the box, with the propeller mounted in an excentric position upon an axle, which may be turned by toothed gear, a rotary chain, or a band, connected to any first mover. The propeller, in this figure, is formed in the shape of what is technically called a snail; it revolves in the direction of the arrow, and, as it revolves, is intended to press the water out through the tangent-formed channel.

Fig. 10, is another modification of the same contrivance, in which the propeller is formed by a wheel, having curved paddles placed in the directions of convolute curves round the rim; these paddles being the segments of a circle. Fig. 11, is another modification of the same, in which straight paddles are attached in the positions of tangents round the rim of a wheel.

Fig. 12, is a slight variation from, or modification of, the snail first described, the interior of the snail being divided by a partition.

These propellers are said to be also applicable to the raising of water in wells; and, for this purpose, one of them is mounted either perpendicularly or horizontally, and rotary motion being communicated to it, it forces the water up a tube or pipe adapted for that purpose. [*Inrolled in the Inrolment Office, April,* 1832.]

To James Lang, *of Greenock, North Britain, flax-dresser, for his invention of certain improvements in machinery for spreading, drawing, roving, or spinning flax, hemp, and other fibrous substances, dressed or undressed.*—[Sealed 24th September, 1831.]

This invention is described as consisting in the arrangement of a series of machines, in order to carry on the several operations of spreading, heckling, drawing, roving, and spinning of flax, hemp, &c. in consecutive connexion; the object being to prepare coarse yarns for ropes and cables.

The machines employed are the ordinary gill, and the bobbin and fly frame, without any perceptible variation from the constructions commonly used, except in the following particulars, which constitute the novel features claimed, viz. :—

First, there is a mode of shifting the situation of the feeding rollers of the gill, by sliding the frame in which they turn upon an inclined bracket, for the purpose of adjusting the distance of those rollers from the travelling heckles, according to the length of the fibres of flax or hemp operated upon. In some cases, where the fibres are very short, two pairs of feeding rollers are employed, their rotary action being connected by toothed gear.

Second, passing the slivers as they descend from the drawing rollers through trumpet tubes lined with felt, or some such material, in order to give greater compactness to the sliver before it becomes twisted and wound by the bobbin and fly below.

Third, a mode of increasing the drag of the bobbin of the spindle, in order to make it wind on the yarn with greater tension, which is effected by two coupling

surfaces, formed as caps under the bobbin; these being pressed together by unjustable springs.

The fourth feature claimed is, the arrangement or combination of machines having the above described novelties, in which the flax or hemp is first spread out, then fed in by rollers to the travelling heckles of the gill, its fibres being held or retained by the adjustable feeding rollers at certain lengths, while the heckles pass through them, and comb the fibres straight. The sliver then proceeds through the drawing rollers, and thence descends into cans.

A second process of heckling and drawing, for the purpose of refining the fibres, is then to be performed in another gill machine, in which two slivers may be operated upon; and this may be followed by a third and fourth similar operation: and in conducting the slivers from the last pair of drawing rollers to the bobbins and flies of the roving operation, they are to be passed through the trumpets with the felted linings as aforesaid, for the purpose of smoothing them before twisting; the bobbins being retarded in the way described, in order to give tension to the yarn.—[*Inrolled in the Inrolment Office, March,* 1832.]

To FRANCIS PETTIT SMITH, *of Hendon, in the county of Middlesex, farmer, for his invention of an improved propeller for steam and other vessels.*—[Sealed 31st May, 1836.]

THIS is another edition of the so-often-repeated Archimedes' propeller, formed by a sheet of thin plate wound obliquely round a cylinder, as a screw. This screw, or propelling shaft, is placed longitudinally at the side of

the boat, toward the stern, as shown in Plate V., at fig. 13. (We presume two are to be employed, one on each side of the keel). It is mounted upon pivots or an axle, and turns freely in the water, receiving its rotary motion through bevel gear, connected with its axle from the steam-engine within the vessel. It is intended that, by the oblique surface of the screw pressing against the water as it revolves, that the vessel to which the screw is attached, shall be propelled in the opposite direction to the resistance.

This contrivance is so well known, that it is perfectly unnecessary for us to say any more upon the subject; indeed, we have told the whole, as the Patentee states that it may be driven by any suitable construction of gear, or by a band and pulley, at any desired speed; and the propeller may be made of wood, sheet iron, or other suitable material, and with the screw set at various angles.

The specification concludes by saying, "Whereas, I claim, as my invention, the propeller hereinbefore described, whether arranged singly, in an open space in the dead wood, or one on each side, or more forward or more aft, or more or less deep in the water."—[*Inrolled in the Inrolment Office, November,* 1836.]

To THOMAS WALKER, *of Burslem, in the county of Stafford, mechanic, for his invention of improvements in extinguishers to candles, and in the application of such extinguishers to candles and candlesticks.*—[Sealed 3rd July, 1835.]

THESE improvements consist in the combination and arrangement of certain simple pieces of mechanism,

and their adaptation to a candlestick, for the purpose of causing an extinguisher, by the action of a spring, when disengaged by means of a trigger, to fall over and cover the wick and flame of the candle, after it has been burning for any given space of time; producing what may be denominated a self-acting extinguisher.

The improvement may be applied in a variety of forms, the essential and leading features being a spring, or other mechanical force, always acting upon the extinguisher, which is mounted on pivots, or an axle, at the side of the nozle of the candlestick, for the purpose of throwing the extinguisher over the top of the candle; and a lever, or trigger, acting upon a tail-piece extending from the extinguisher, for the purpose of restraining the action of the spring, and keeping back the extinguisher until the proper time arrives for discharging it; which is to be done by means of a pin extending from the side of the candle, the candle being progressively raised by a spiral spring as it consumes in burning, and in so rising brings the pin in its side to act against the trigger and discharge it.

In order to explain more particularly the construction of this invention, Plate V., fig. 14, represented a candlestick with the improvement attached thereto; *a*, is the socket of the candlestick, which should be made sufficiently long to contain the whole length of the candle *b*, shown by dots. This socket is enclosed at top by a cap *c*, in which there is an aperture in the centre for the wick to protrude through. Below the candle in the socket there is a helical spring *d*, represented by dots, having a disc at its top upon which the bottom of the candle rests, and the spring acting upward, forces the top of the candle against the under part of the cap.

The extinguisher *e*, is of a conical form, and turnes upon an axle mounted in ears, extending from the side of the nozle. Round the axle of the extinguisher a small spring is coiled, the tension of which is designed to pull the extinguisher over the candle into the situation shown by dots.

From the back of the extinguisher a small tail or trigger *f*, extends, and a small lever *g*, hanging upon a pivot fixed in the side of the candlestick, is intended to take hold of the tail-piece or trigger, for the purpose of confining the extinguisher in the open position shown. A long slit in the socket of the candlestick at *h*, allows a pin *i*, to be stuck into the side of the candle at any distance from the top, and as the candle burns, this pin rising with the candle, comes against the under part of the lever *g*, at the time required, according to the position of the pin, and lifts it so as to disengage the trigger *f*, and allow the extinguisher to be thrown over by its coiled spring into the closed position shown by dots, which consequently extinguishes the candle.

The Patentee concludes by saying, that he does not intend to confine himself to the precise form of the parts shown, but claims a self-acting extinguisher thrown over the wick of the candle by a spring of any kind, or any other suitable mechanical contrivance which shall enable it to be discharged by a trigger on the expiration of any determined space of time, this trigger being acted upon by a pin or arm, extending from the side of the candle through a slit in the socket of the candlestick, which is the subject of the invention, however its shape or the position of its parts may be varied.—[*Inrolled in the Inrolment Office, September*, 1835.]

To John Isaac Hawkins, *of Chase Cottage, Hampstead-road, in the county of Middlesex, civil engineer, for an improvement in the blowing-pipe of blast-furnaces and forges, being a communication from a foreigner residing abroad.*—[Sealed 28th September, 1836.]

This invention consists in a peculiar mode of forming the discharging aperture or twyer hole through which the blast of wind is blown into a furnace, the object being to deliver the blast in an extended and thin sheet, in order that it may supply the full quantity of oxygen required for supporting combustion in the furnace, without damping the fire, which is commonly found to be the effect of throwing in a large body of cold air in one volume.

The Patentee proposes to obtain this advantage by enlarging in a conical shape that end of the blow-pipe which is next to the furnace, and placing within this concentrically a conical plug, its point or apex being toward the blowing machine. The wind from the blowing machine being thus intercepted by the conical plug, becomes distributed over the space between the surfaces of the conical aperture and the plug, and is thereby delivered into the furnace in a thin and widely spread out cylindrical sheet.

The conical plug is supported within the twyer hole by cross bars fixed to the sides, these bars being made to pass through apertures in the cone. In order to regulate the quantity of wind to be conducted through the space between the conical opening and its plug, the distance between the two may be varied by shifting the plug forward or backward.

Some modifications of this are proposed, as in dividing

the discharging orifice into several branches, making these orifices oblong, in order to deliver the wind in broad thin sheets, or distributing several mouth-pieces around the fire, or along the fire.

The claim of invention is the enlarged mouth-piece having a conical plug within it; two or more oblong orifices, or five or more orifices placed in a circle.—[*Inrolled in the Inrolment Office, March,* 1837.]

To Thomas Robson, *of Park-road, Dalston, in the county of Middlesex, operative chemist, for his invention of improvements in firing signals and other lights.*—[Sealed 22nd November, 1836.]

This invention is described as relating to that construction of signal lights which are inflamed by the action of two chemical substances brought into combination. The specification states, in the first place, that the way in which these chemical substances have been heretofore applied in the instruments which are to constitute the signal lights, has been found to be attended with considerable danger, owing to the circumstance, that by shaking in carriage, although carefully packed, or by an accidental blow, the chemical materials have been brought into contact, and explosion has ensued. It is the object, therefore, of this patent, to furnish the means of effectually separating the chemical materials in signal lights at all times, except when about to be discharged, thereby preventing the possibility of an accidental explosion.

Plate V., figs. 7, and 8, represent the cases of two signals, differently formed. The combustible materials are placed in the head part of each, at *a, a*; the chemi-

cal materials, by the combination of which fire is to be obtained, at *b*, which part is shown in section; and a train or quick match *c*, is represented by dots, extending from the igniting matter to the combustible matter.

The two sorts of chemicals for producing the ignition are to be placed in the recess at *b*, intercepted by a plate of tin passed between them. The composition of these matters are not claimed as new; but those which are recommended to be employed in these signals, are a mixture of two parts of oxymuriate of potash, and one part of sulphuret of antimony, with which the fibres of cotton are to be impregnated; and contiguous to this, a small glass globule is to be placed, containing sulphuric acid. When this glass globule has been broken, by a blow or pressure, the sulphuric acid will be allowed to flow into the cotton, and by there acting chemically upon the material with which the cotton is impregnated, will instantly produce ignition.

The invention is, guarding these chemical materials, by placing them in the recess *b*, and introducing a small partition of tin or other matter *d*, between the cotton and the glass globule, by which means the communication between the two chemical matters will be intercepted; and in the event of the glass globule being accidentally broken, which is not likely to happen in that situation, its contents will not be allowed to flow into the other materials; but when the signal light is to be discharged, the slip of tin *d*, must be withdrawn from the recess. The Patentee proposes that a screw shall be introduced into the recess *b*, for the purpose of crushing the glass globule, and thereby producing ignition; which, passing by the slow match *c*, to the combustible materials at *a*, will cause the signal to take fire.—[*Inrolled in the Inrolment Office, May*, 1837.]

To JOHN FUSSELL, *of Nunney, in the county of Somerset, edge-tool maker, for his invention of improvements in pumps.*—[Sealed 29th December, 1835.]

THE Patentee states, that it is well known, in working pumps, particularly where the water has to be raised from a considerable depth, that it frequently happens that the water will not follow the bucket so quickly as to give full effect to the power exerted. To remedy this evil, therefore, it is proposed to form a chamber by the side of the pump barrel, opening into the rising main.

Plate V., fig. 15, represents a pump in section, in which *a*, is the rising main; *b*, the barrel; *c*, the bucket; and *d*, the auxilliary chamber, opening at the bottom into the rising main below the foot valve.

The Patentee goes on to say, that it will be found, by applying this improvement to pumps, that the following effects will take place:—on first working the pump, before any water rises in the main, the action of the piston or bucket will be to effect an exhaustion of the air from the rising main, and also from the chamber *d*; the water will then flow up and fill the rising main, and the pump barrel; partially filling the chamber *d*, at the same time. The consequence of this will be, that in the future working of the piston, immediately on its rising from the foot valve, the water in the chamber *d*, will more readily pass into the pump barrel than the whole mass of the water in the suction pipe (the rising main); but that in the descent of the piston, the water will flow from the main, and again occupy the chamber *d*, ready for the next up-stroke of the piston. This constitutes the first head of the invention claimed under this patent.

The second feature of improvement, is forming an air-chamber above the bucket, by constructing it with a

hollow stem *a*, as shown in fig. 16. The object and effect of an air-chamber above the bucket, for equalising the flow of the water, has been so long, and so well known, that we need say no more upon the subject. The Patentee has left us to discover, by conjecture, what he intends to claim as new under this patent.—[*Inrolled in the Inrolment Office, June*, 1836.]

SCIENTIFIC NOTICE.

ACT OF CONGRESS OF THE UNITED STATES OF AMERICA, RESPECTING THE LATE CALAMITOUS CONFLAGRATION OF THE PATENT OFFICE, WASHINGTON, ON THE 15TH DECEMBER, 1836.

Continued from vol. x. p. 313.

Section 4. And be it further enacted, that it shall be the duty of the Commissioner to procure duplicates of such models so destroyed, as were most valuable and interesting, and whose preservation would be important to the public, and such as would be necessary to facilitate the just discharge of the duties imposed by law, or the Commissioner in issuing patents, and to protect the rights of the public and of patentees in patented inventions, provided that a duplicate of such models may be obtained at a reasonable expense. And provided also, that the whole amount of expenditure for this purpose shall not exceed the sum of one hundred thousand dollars. And there shall be a temporary board of Commissioners, composed of the Commissioner of the Patent Office, and other persons, to be appointed by the President, whose duty it shall be to determine upon the best and most judicious mode of obtaining models of suitable construction, and to determine what models may be so procured. And these Commissioners may make such regulations, terms, and conditions, not inconsistent with law, as may be necessary to carry the provisions of this section into effect.

Section 5. And be it further enacted, that whenever a patent

shall be returned for correction, and re issue under the 13th section of the late Act; and whenever the patentee shall desire several patents to be issued for distinct and separate parts of the thing patented, he shall first pay, in addition to the sum provided by that act, the sum of thirty dollars for each additional patent so to be issued. Provided, however, that no patent made prior to the aforesaid fifteenth day of December, shall be corrected and re-issued until a duplicate of the model and drawing of the thing as originally invented, verified by oath, as shall be required by the Commissioners, shall be deposited in the Patent Office; nor shall any addition of an improvement be made to any patent heretofore granted, nor any new patent to be issued for an improvement made in any machine, manufacture, or process, to the original inventor, assignee, or possessor of a patent therefore, nor any disclaimer be admitted to record, until a duplicate model and drawing of the thing originally invented, verified as aforesaid, shall have been deposited in the Patent Office, if the Commissioner shall require the same; nor shall any patent be granted for an invention, improvement, or discovery, the model or drawing of which shall have been lost, until another model and drawing, if required, shall be deposited in the Patent Office. And in all such cases, as well as in those which may arise under the third section of this act, the question of compensation for such models and drawing shall be subject to the judgment and decision of the Commissioners provided for in the fourth section, under the same limitations and restrictions as are therein prescribed.

Section 6. That any patent hereafter to be issued, may be made and issued to the assignee or assignees of the inventor or discoverer, the assignment thereof being entered of record, and the application, therefore, being duly made, and the specification duly sworn to by the inventor. And in all cases, hereafter, the applicant for a patent shall furnish duplicate drawings, whenever the case admits of drawings, one of which to be deposited in the office, and the other to be annexed to the patent, and considered a part of the specification.

Section 7. That, whenever any Patentee shall have, through in-

advertence, accident, or mistake, made his specification of claim too broad, claiming more than that of which he was the original or first inventor, some material and substantial part of the thing patented being truly and justly his own, any such Patentee, his administrators, executors, and assigns, whether of the whole or of a sectional interest therein, may disclaim such parts of the thing patented, as the disclaimant shall not claim to hold by virtue of the patent or assignment, stating therein the extent of his interest in such patent, which disclaimer shall be in writing, attested by one or more witnesses, and recorded in the Patent Office, on payment, by the person disclaiming, of the sum of ten dollars. And such disclaimer shall thereafter be taken and considered as part of the original specification, to the extent of the interest which shall be possessed in the patent by the disclaimant, and by those claiming by or under him subsequent to the record thereof. But no such disclaimer shall affect any action pending at the time of its being filed, except so far as may relate to the question of unreasonable neglect or delay in filing the same.

Section 8. That, whenever application shall be made to the Commissioner for any addition of a newly-discovered improvement to be made to an existing patent, or whenever a patent shall be returned for correction and re-issue, the specification of claim annexed to every such patent shall be subject to revision in the same manner as are original applications for patents; the Commissioner shall not add any such improvement to the patent in the one case, nor grant the re-issue in the other case, until the applicant shall have entered a disclaimer, or altered his specification of claim in accordance with the decision of the Commissioner; and in all such cases, the applicant, if dissatisfied with such decision, shall have the same remedy, and be entitled to the benefit of the same privileges and proceedings, as are provided by law in the case of original application for patents.

Section 9. That, whenever, by mistake, accident, or inadvertence, and without any wilful default or intent to defraud or mislead the public, any Patentee shall have in his specification, claimed to be the original and first inventor or discoverer of any material or

substantial part of the thing patented, of which he was not the first and original inventor, and shall have no legal or just right to claim the same, in every such case the patent shall be deemed good and valid for so much of the invention or discovery as shall be truly and *bona fide* his own. Provided it shall be a material and substantial part of the thing patented, and be definitely distinguishable from the other parts so claimed; and every such Patentee, his executors, administrators, and assigns, whether of a whole or of a sectional interest therein, shall be entitled to maintain a suit at law on such patent, for any infringement of such part of the invention or discovery as shall be *bona fide* his own, notwithstanding the specification may embrace more than he shall have any legal right to claim. But, in every such case in which a judgment or verdict shall be rendered for the plaintiff, he shall not be entitled to recover costs against the defendant, unless he shall have entered at the Patent Office, prior to the commencement of the suit, a disclaimer of all that part of the thing patented, which was so claimed without right, provided, however, that no person bringing any such suit shall be entitled to the benefit of the provisions contained in this section, who shall have unreasonably neglected or delayed to enter, at the Patent Office, a disclaimer.

Section 10. The Commissioner is empowered to appoint agents in twenty of the principal cities of the United States, for the purpose of forwarding to the Patent Office all such models, specimens of ingredients, and manufactures, as shall be intended to be patented or deposited therein, the transportation of the same to be chargeable to the patent fund.

Section 11. That, instead of one examining clerk, as provided by the second section of the act, to which this is additional, there shall be appointed two examining clerks, each to receive an annual salary of 1500 dollars; and also an additional copying clerk, at an annual salary of 800 dollars. And the Commissioner is also authorised to employ, from time to time, as many temporary clerks as may be necessary to execute the copying and draughting required by the first section of this act, and to examine and compare the

records with the originals; who shall receive not exceeding seven cents for every page of one hundred words; and for drawings and comparison of records with originals, such reasonable compensation as shall be prescribed by the Commissioner.

Section 12. That, whenever the application of any foreigner, for a patent, shall be rejected and withdrawn for want of novelty in the invention, pursuant to the seventh section of the act, to which this is additional, the certificate thereof of the Commissioner shall be a sufficient warrant to the Treasurer to pay back to such applicant, two-thirds of the duty he shall have paid into the Treasury on account of such application.

Section 13. That, in all cases in which an oath is required by this act, or by the act to which this is additional, if the person of whom it is required shall be conscientiously scrupulous of taking an oath, affirmation may be substituted therefore.

Section 14. That, all monies paid into the Treasury of the United States, for patents and for fees for copies furnished by the Superintendent of the Patent Office, prior to the passing of the act, to which this is additional, shall be carried to the credit of the patent fund created by the said act; and the monies constituting said fund shall be appropriated for the payment of the salaries of the officers and clerks provided for by the said act, and all other expenses of the Patent Office, including all the expenditures provided for by this act; and also, for such other purposes as may be hereafter specially provided for by law. And, the Commissioner is hereby authorised to draw upon the said fund, from time to time, for such sums as shall be necessary to carry into effect the provisions of this act, governed, however, by the several limitations herein contained; and it shall be his duty to lay before Congress, in the month of January, annually, a detailed statement of the expenditures and payments by him made from said fund; and he shall also lay before Congress, in the month of January, annually, a list of all patents which shall have been granted during the preceding year, designating, under proper heads, the subject of such patents, and furnishing an alphabetical list of the Patentees, with

their places of residence; and he shall also furnish a list of all patents which shall have become public property during the same period, together with such other information of the state and condition of the Patent Office, as may be useful to Congress or to the public.

Approved 3rd March, 1837.

REPORT OF TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS.

SESSION 1837.—January 10.

JAMES WALKER, Esq., F.R.S., L. and E., President, in the Chair.

THE President, having called the attention of the meeting to the conversation on cements which had taken place when they last met, requested Col. Pasley, who had made many extensive experiments on this subject, to give the meeting some account of the results at which he had arrived.

Col. Pasley said, that his attention had been directed to the subject of cements from reading in Smeaton's works that all water limes were composed of carbonic acid and clay; since, on dissolving these limes in carbonic acid, clay, of which brick could be made, was left. From this remark he had been led to make experiments similar to the following: he took *two* parts of chalk and *one* of clay. The chalk being pounded and mixed with the clay, balls were formed, which being burnt in a crucible, were ground and mixed as cements usually are. Some of these experiments failed, but he attributed their failure to his having used clay which was coarse and sandy; whence it appears that substances will unite when in the form of a fine powder which will not unite when in a coarser form. These experiments were made in the years 1829, 30, 31, and 32. Subsequently, in 1836, he repeated his more successful experiments, but without the same success; and he attributed their failure to the fact of the clay (the blue clay of the Medway) containing a greater proportion of carbonate of lime

than it had contained five or six years before. Continuing his experiments, he found that *four* lbs. of dry chalk and *five* pounds of the moist blue clay, fresh from the Medway, made the strongest cement, but he had determined many other proportions which set immediately under water. With cement made according to the above proportions, thirty-one bricks had been set out from a wall, one brick being added every day, omitting the Sundays.

He had cemented bricks together, and he found in every case that the bricks gave way and not the cement. He estimated the breaking force at the joints at about 5000 lbs. on the thirty-six square inches, the surface of the brick. On comparing the strength of this cement with the chalk mortar which had united some bricks more than thirty years, he was led to consider the adhesive power of his artificial cement forty days' old as at least twenty times the power of the mortar.

January 31, 1837.

W. Cubitt, Esq., V.P., in the Chair.

"Description and Drawing of an Apparatus designed by Mr. Mitchell for Boring Wells; by Mr. Mitchell, Jun., of Sheerness."

This apparatus consists of a frame, similar to that of a pile engine in which the rods are suspended; on one of the rods is a wheel fixed on a square spindle (through which the rod can slide), and turned by means of a pinion and crank; the axis of this pinion serves also to draw the rods, since they may be drawn up by a single rope, or by a tackle suspended to the top of the frame, the rope of the block passing round the winch. The auger is regulated in the cut by a screw and nut; thus the rods are always kept from bending in the hole, and the bore from getting out of the perpendicular. This apparatus is found peculiarly convenient in chalk, and when stones are met with; since in most cases, if the auger be sufficiently hard, the stones flash off in small chips similar to gun flints.

"A Method of breaking Ice by forcing it upwards instead of downwards; practised on the Herefordshire and Gloucestershire Canal in the Winters of 1834-1835 and 1835-1836; by Stephen Ballard, A. Inst. C.E."

Mr. B. places strong planks covered on their upper side with sheet iron in the front of a boat, so as to form an inclined plane pointing downwards, the lower end of which goes under the ice. The boat, drawn by a horse, is steered by a person walking on the shore with a long shaft attached to a pole projecting over the stern. It is believed that one boat, horse, and boy, would thus break much more ice than three boats worked in the usual manner.

Mr. H. H. Price called the attention of the Institution to the importance of ascertaining what are really the constituent elements of Artificial Hydraulic Mortars and Cements; several memoirs have been read before the Institute of France on this subject, but they exhibit great discrepancies as to the principles of the formation of these cements. It is of the greatest importance to the engineer to know from the materials at hand how to make a cheap average hydraulic mortar.

Col. Pasley remarked, that he considered Smeaton's Researches as the only ones of value; the French philosophers had followed out many of his suggestions in great detail. Two systems appear to have been pursued in France, the one in which the substances are burnt previously to their being mixed, the other in which they are mixed in a state of minute division previous to their being burnt. The Aberthaw limestone used by Smeaton consisted of carbonate of lime and clay; *one* part of the lime from this stone and *two* parts of sand make a cement which sets very hard in time, but the joints must be protected at first by Sheppey or some similar cement.

Mr. Lowe was of opinion that very much must be attributed to the presence of silica; this evidently played a most important part. Limes have exceedingly different qualities; two makers using the same quarry would produce very different limes; if lime is flare-burnt, that is, burnt at a white heat, all the carbonic acid

is driven off suddenly; the properties of lime burnt at a slow heat will differ much from the properties of the preceding. The mechanical mixing is also of the greatest importance; the Barrow lime is a natural hydraulic lime, but it must be well beaten with water and silica or sand.

Mr. Blunt, from America, gave, at the request of the Chairman, an account of the system of signals which were employed in the geometrical operations now carrying on in America.

February 7, 1837.

The PRESIDENT in the Chair.

The conversation on artificial cements being resumed, several members expressed their opinions on the causes to which the hardening of mortar was to be referred. Hydrate of lime is the basis of all mortars, but this will not make a water mortar, or cement, without the addition of a metallic oxide. The addition of clay will effect this, but most clays contain a metallic oxide.

Mr. Francis Bramah gave the analysis of Dutch Terras, of Basalts, and of Puzzolana, according to different experimenters; in all these there is a considerable proportion of iron; and the addition of any of these to hydrate of lime will make a water mortar. Thus it appears that we must carefully distinguish between a good mortar, and a good water mortar or cement. Hydrate of lime is the basis of both. Good mortar depends for its excellence on the slow absorption of carbonic acid, and the slow absorption of this is, according to Tennant, the essential condition for good mortar. It is remarkable that, according to Pliny and Vitruvius, the Romans kept their mortar for three years, and it is now the custom among builders to bury mortar, or to keep it in a cellar; it is thus prevented from absorbing carbonic acid from the atmosphere, or, in other words, from being reconverted into limestone. According to some experiments of Tennant it appears, that mortar in 3¼ years will regain 63 per cent. of the carbonic acid of which it had been deprived. The absorption of carbonic acid being the condition of mortar hardening, if it be

used under circumstances such that this absorption cannot take place, as under water, some other material must be supplied, and the addition of a metallic oxide appears to supply the required element.

With respect to an hypothesis of Kirwan's which had been mentioned, as to the peculiar properties of iron and clay, Mr. J. I. Hawkins stated a singular fact which had come under his own observation, namely, that the rust of iron has a peculiar disposition to travel through moist clay; the rate of this transfer was in one case about *one* inch per month.

"On Locomotive Engines, and the means of supplying them. By Jacob Perkins, M. Inst. C. E."

The object of this paper is to show how locomotives may be supplied. The practical defects of the present system of locomotives arising from the furring up or bruising out of the tubes of the boilers, Mr. Perkins proposes that steam should be generated through the medium of surcharged steam. He states, that if a tube hermetically sealed be filled to $\frac{1}{60}$th of its contents with water, the steam arising from the water will not acquire sufficient elastic force to burst the tube, but will have a remarkable property of transferring heat. The steam being saturated with heat, requires no more, and the tube being vertical, this surcharged steam becomes a floating agent, through which the heat ascends its own levity, so that the *top* of the tube would become red hot, were it not immersed in water. The difference between pure and surcharged steam is, that surcharged steam gives up its heat without condensing it, whereas pure steam must necessarily condense as it parts with its heat. Mr. Perkins states, that a boiler has generated steam on this principle under the action of a fervent heat during the last seven months, and without the least leakage or incrustation.

Mr. Perkins then details the advantages which may be gained from the adoption of his principles, and proceeds to make some remarks on the manufacture of locomotives. He recommends the

division of labour, that the engines should all be fac-similes, and each part be manufactured at the places best adapted for their production. The paper concludes with observations on the most effective application of steam; on the best velocity of the piston, and relative proportions for the diameter and length of the cylinder.

Mr. Blunt, at the request of the President, then stated some facts respecting the American steamers. The double boats had been given up, and the average speed of the best boats was fifteen miles per hour. One boat, whose length is 220 feet, and breadth eighteen feet, has an average speed more than the preceding. They had recently introduced a ferry boat, which might, he conceived, be extremely serviceable in our rivers; in the Thames for instance, where there are a great number of vessels. The boat had bows at each end, so that it could go either way, and rudders at each end worked by one helm; the boat is thus steered at both ends. The rudders are placed in a semicircular chamber at each end, and can be reversed round; they are worked by a chain passing round the wheel of both and crossing in the middle, so that the boat is brought about in the same direction by the contrary action of the two bows. The wheel and chain cannot get out of order, and the rudder begins below the water, so that the boat can go through the broken ice. Such a ferry boat will go round without going her length, which is about 100 feet.

Mr. Blunt had repeatedly gone a distance which he knew, from actual trigonometrical measurement, to be seventy-four miles in five hours. The boats completed the distance from New York to Albany, not less than one hundred and fifty miles in ten hours. The speed of these boats, as compared with that of the boats in this country, is not to be wondered at, when it is remembered that the boats are built simply and expressly for speed. The Americans pay great attention to the form of their boats; the water is smooth, the engines are placed on the deck and the boilers on the wings; and they spare no expenditure of power provided speed can be obtained.

List of Patents

Granted by the French Government from the 1st of July to the 31st of December, 1836.

(Continued from p. 59.)

To Laplace, Brothers, and Lemeille, of Valenciennes, for a new method of manufacturing.

— Gonlofret and Co., of Marseille, for the manufacturing of a new mineral manure.

— Ferdinand Meisner, of Paris, for an improved paper machine.

— Dubreuil, of Juval, near Gisors, for a means of superseding the use of weights and ropes for regulating the progress of the work-beam in calico frames.

— Marie Joseph Denis Fariot, of Paris, for a new steam-engine.

— Sylvain Boudart, of Paris, glover, for a machine called by him chirometer, for measuring the hand.

— Philippe Mathieu and Co., of Vaugirard, for a new means of obtaining and using certain resinous products.

— Guinard, Brothers, of Marseille, for a means of cutting glass and crystal.

— Honoré Celestin Piovoux, of Lyon, for an improved apparatus applicable to the manufacturing of silk fabrics.

— Bourbon de Rouvre, of Chaumont, for an apparatus for washing and pressing instantaneously the pulp of beet root.

— Xavier Jourdain, of Altkirck, for a new mechanism for driving the shuttle, applicable to all weaving frames.

— Jean Baptiste Justin Lassie, for improvements in windmills.

— Maness, Mallet, and Co., of Valenciennes, for cast iron conical vases used for crystallising sugar.

— Jean André Guenard, of Courtenay, for a sawing machine.

— François Burg Jernior, of Paris, for the application of a prepared sponge to the dressing of issues.

ADDITIONAL SPECIFICATIONS INROLLED BY THE FOLLOWING PATENTEES.

To John Brooks, of Manchester, represented by Mr. Perpigna,

advocate of the French and Foreign Office for Patents, Rue de Choiseul, on his patent for the preparing of certain colours used in the printing of calico.

To Eude and Cailly, of Offranville, represented by Mr. Perpigna, on their patent for the means of imitating on a small vessel all the motions of the sea.

— Auguste Jean Baptiste Gallais, of Paris, represented by Mr. Perpigna, on his patent for a preparation of milk called lactoline.

— Thomas Elliot and Co., of Pont Andemer, represented by Mr. Perpigna, on their patent for producing malleable iron.

Patents granted by the French Government from the 1st of January to the 1st of July, 1837.

PATENTS FOR FIFTEEN YEARS.

To Edward Ashworth, of Lancaster, represented in Paris by Mr. Perpigna, advocate of the French and Foreign Office for Patents, Rue de Choiseul, for improvements in machines used for spinning cotton, silk, and other fibrous substances.

— Frederic Edward Harvey, of Tipton, county of Stafford, represented by Mr. Perpigna, for improvements in the manufacturing of metallic tubes and rails, applicable to various purposes.

— Ambrose Brewin, of St. Quentin, represented by Mr. Perpigna, for a method or methods of weaving or manufacturing divers kinds of goods and wares, and for machines or machinery applicable thereto.

— John Stephens, of London, represented by Mr. Perpigna, for improvements in the construction of steam generators.

— Michel Emmanuel Valadon, architect, represented by Mr. Perpigna, for improvements in the construction of bottles used for admitting and delivering, by the same orifice, solid or liquid substances.

To Thomas W. Storrow, citizen of the United States, represented by Mr. Perpigna, for an apparatus for preparing and colouring caoutchouc, and laying it on fabrics of any kind, on skins, hides, or other substances, without the use of a solvent.

— William Newton, civil engineer, of London, represented by Mr. Perpigna, for improvements in looms, for the purpose of enabling such looms to weave bristles, horse hair, whalebone, straw, cane, and other materials of limited lengths as weft or shoot with warp of silk, cotton, or other fibrous substances.

— Edwin Ward Jackson, of Leeds, represented by Mr. Perpigna, for improvements in machines used for cleaning and preparing wool.

— William Gossage, chemist, of Stoke Prior, Broomsgrove, in the county of Worcester, represented by Mr. Perpigna, for improvements in the manufacturing of white lead.

— Henry Bernard Chaussenot, civil engineer, represented by Mr. Perpigna, for an improved controller, for indicating the number of persons which enter in the coaches called omnibus.

— Henry Bernard Chaussenot, civil engineer, represented by Mr. Perpigna, for various apparatus calculated to prevent the explosion of steam boilers.

— De Gatigny and Co., represented by Mr. Perpigna, for improvements in the manufacture of paper hangings.

— Mrs. Anne Charlotte Matelin, of Paris, for improvements in the manufacturing earthenware by mechanical pressure.

— Hyacinthe Marius Sebastien du Lauzet, of Paris, for a new metallic pen.

— Jean Baptiste Charles Jolly, of Paris, for improvements in dyeing all kinds of fabrics.

— Dubrunfaut, of Paris, for a new process of manufacturing starch without fermentation.

— Jean Girandeau, of Paris, for a syrup of sarsaparilla.

— Jean Baptiste Roux, of Paris, for a motive power, wherein hot air is used instead of steam.

— Trefouel Desnoyers, of Paris, for a process for disinfecting and

pulverising night-soil, and making with the same a kind of manure.

To Zephire Augustin Delaire, of Paris, for an improved gun.

— Pierre Fortuné Peyron, of Marseille, for an improved filter for filtering syrups.

— Simon Joly, of Ben St. Martin, near Metz, for a process for destry ing weasels and other noxious insects.

— Gabriel Constant Omont, of Paris, for a new kind of steam-carriage.

— Louis Nicolas de Mecquenem, of Olisy, for an improved nail machine.

— Achille Collas, civil engineer, of Paris, for a means of re-producing, on any kind of substance, sculptures of any sort.

— Arthur Charles de Bonnard, of Maudres, for an improved method of cupping.

— Jean Charles Leopold Daubreville, civil engineer, of Planchez les Mines, for improvements in locks.

— J. William Byton, of London, for improvements in tea caddies and other japanned boxes.

— Vinceslas Kirtschmars, of Strasbourg, for an improved pump.

— William Wayte, of Barford, for improvements in the methods and machinery used for propelling ships.

— Auguste Pierre Dubrunfaut, of Paris, for a means of extracting several products from the molasses of beet-root besides alcohol.

— Jean Vesan Avy, of Cadenet, for a machine for spinning silk.

— Ledru and Sorel, of Paris, for an improved method of preserving iron and steel from oxidation.

— Jean Baptiste Falhon, of Paris, for improvements in window frames.

— The Marquis of Prié, of Brussels, for improvements in the spinning of flax.

— Nicolas Wolff, of Paris, for improvements in the furnaces used for carbonising wood.

— Louis Janvier, of Paris, for an improved method of propelling vessels, applicable to steam-boats.

To Bourlet d'Amboise, of Paris, for a means of manufacturing a new kind of alimentary substance, called by him ondæline.

— Charles and Xavier Imbs, for a new method of tanning skins.

— Thuillier and Rodier, of Paris, for improvements in fire-arms.

— Achille Théodore Gronnier, of Paris, for an improved apparatus applicable to the top of the chimney of smelting furnaces, for the purpose of heating the air used in such furnaces.

PATENTS FOR TEN YEARS.

To John Westhead, of Manchester, represented in Paris by Mr. Perpigna, Advocate of the French and Foreign Office for Patents, Rue de Choiseul, for an improved machine for cutting into threads, either caoutchouc, leather, skins, or other substances.

— Auguste Marie Théodore Loth, of Paris, represented by Mr. Perpigna, for improvements in parasols and umbrellas.

— Jean Baptiste Roudet, represented by Mr. Perpigna, for improvements in the manufacturing of gloves.

— Noel Pierre Chaulin, stationer, represented by Mr. Perpigna, for a new kind of inkstand.

— Michel Eisenmenger, represented by Mr. Perpigna, for a rotary thermometer.

— Michel Eisenmenger, represented by Mr. Perpigna, for a philosophical instrument, called baro-thermometre.

— Michel Eisenmenger, represented by Mr. Perpigna, for a philosophical instrument, called by him pneumat-areometre.

— Lesguillier-Criquet, represented by Mr. Perpigna, for improvements in the manufacturing of biscuits.

— Simon Alleau, store manufacturer at St. Jean d'Angely, for improvements in stills for distilling spirits.

— Henri Bouchet, of Paris, for the preparation of a new substance for marking paper.

— Eugène Duchenim, civil engineer, for a rotary steam or gas engine.

— Talabot, Brothers, merchants, of Paris, for an improved method of reducing divers kinds of ores in close vessels.

— Dumas-Chermette, of Lyon, for a machine called by him com-

pensating regulator, and applicable to the manufacturing of any kind of fabric.

To François Victorin Jérome, of Amiens, for a machine for purifying corn.

— Marie Urbain Troublé, of Paris, for a machine for printing calico and other fabrics.

— Urbain Delatour, of Paris, for articulated pattens, which enable those that use them to float in the water without ever sinking.

— Jean Lagarde Carpenter, of Damazan, near Nérac, for an improved hydraulic machine.

— Charles Faivre, of Nantes, for a new oscillatory steam-engine.

— Jean Baptiste Marechal, of Mannevret, for improvements introduced into the Jacquart frame.

— The Baron de Landon, of Paris, for improvements in the manufacturing of ornamental pins.

— Goulet-Collet, of Reims, for a new system of boring artesian wells.

— Leon Lanzenbery, of Paris, for a new method of dyeing skins in green, with a golden hue.

— Lamy and Levent, of Paris, for an improved method of lighting streets.

— André Chrysostome Gladieux, for an improved loom for the manufacturing of shawls.

— Eugène Charbonnier, of Vaugirard, for an alarum bell which may be adapted to every kind of watch.

— Gabriel Despruneaux, of Paris, for a pump with a fixed piston.

— Jean Severin Blondel, of Rouen, for improvements in power or hand-looms.

— Jules François Dorey, of Ecranville, for an apparatus for extracting the juice of beet-root.

— Timothée Abraham Curtis, of London, for improvements in capsterns.

— Joseph Delestre, of Paris, for an improved dentifrice.

— Jean Baptiste Gritty, of Marseille, for an improved windmill.

(*To be continued.*)

List of Patents

Granted in Scotland since 22nd September, 1837.

To Robert Smith, of Manchester, engineer, for certain improvements in the means of connecting metallic plates for the construction of boilers and other purposes.—2d October.

— George Whitmore, of Austin-friars, London, merchant and underwriter, in consequence of a communication made to him by a foreigner residing abroad, for a new method of combining, by means of machinery and adhesive compositions, all kinds of fibrous materials, such as cotton, silk, flax, hemp, tow, fur, wool, hair, &c. into manufactured articles, which may be applied to the purposes for which paper, pasteboard, millboard, papier macheé, parchment, vellum, leather, woven fabrics, felt, floor-cloth, tarpaulin, and the skins of animals are used.—6th October.

— Thomas Clark, professor of chemistry in Mareschal College, Aberdeen, for improved apparatus to be used in manufacturing sulphuric acid.—6th October.

—James Potter, of Manchester, for certain improvements in spinning machinery.—6th October.

— William Heron, of Southampton-street, Pentonville, London, engineer, and William Davies, of Upper North-place, Gray's Inn-road, London, plumber, for a certain improvement or certain improvements in the construction of boilers for the generation of steam, and heating water or other fluids.—13th October.

— John Chanter, of Earl-street, Blackfriars, London, and John Gray, of Liverpool, engineer, for improvements in furnaces and apparatus connected therewith, for locomotive engines and for other purposes.—18th October.

New Patents
SEALED IN ENGLAND,
1837.

To Thomas Simmons Mackintosh, of Coleman-street, in the city of London, engineer, and William Angus Robertson, of Islington, in the county of Middlesex, gentleman, for their invention of certain improvements in steam-engines.—Sealed 28th September—6 months for inrolment.

To Francis Hoard, of Demarara, but now of Liverpool, Esq., for his invention of improvements in making sugar.—Sealed 30th September—6 months for inrolment.

To Jonathan Dickson, of Charlotte-street, Blackfriars-road, engineer, for his invention of certain improvements in steam-engines and in generating steam.—Sealed 30th September—6 months for inrolment.

To Thomas Clark, doctor of medicine, professor of chemistry, in Mareschal College, Aberdeen, for his invention of an improved apparatus to be used in manufacturing sulphuric acid.—Sealed 30th September—6 months for inrolment.

To Joseph Whitworth, of Manchester, in the county of Lancaster, engineer, for his invention of certain improvements in machinery, tools, or apparatus for turning, boring, planing, and cutting metals and other materials.—Sealed 5th October—6 months for inrolment.

To Ovid Topham, of Whitecross-street, in the parish of St. Luke's, in the county of Middlesex, engineer and millwright, for his invention of certain improvements in the construction of sluice cocks for water-works, and

which improved construction of cocks is also applicable to steam, gas, and other purposes.—Sealed 5th October —6 months for inrolment.

To John Loach, of Birmingham, in the county of Warwick, brass-founder, for his invention of improvements in roller blind furniture, and in the mode of manufacturing the same, part of which improvements are applicable also to other purposes.—Sealed 5th October—6 months for inrolment.

To John Thomas Betts, of Smithfield-bars, in the city of London, rectifier, for improvements in the process of preparing spirituous liquors in the making of brandy, being a communication from a foreigner residing abroad.—Sealed 5th October—6 months for inrolment.

To Antonin Pieux de Rigel, of Vienna, but now residing at Beaufort-buildings, Strand, in the county of Middlesex, engineer, for his invention of improvements in steam-engines.—Sealed 14th October—6 months for inrolment.

To Thomas Vaux, of Woodford, in the county of Essex, land surveyor, for his invention of improvements in tilling and fertilising land.—Sealed 14th October—6 months for inrolment.

To Henry Quentin Tenneson, late of Paris, in the kingdom of France, but now of Leicester-square, in the county of Middlesex, gentleman, for an improved construction of the portable vessels used for containing portable gas, and of the apparatus or machinery used for compressing such gas therein, and of apparatus or mechanism for regulating the issue or supply of gas, either from a portable vessel or from a fixed pipe communicating with an ordinary gasometer, being a communication from a foreigner residing abroad.—Sealed 19th October—6 months for inrolment.

To Edward François Joseph Duclos, late of Samson, in the kingdom of Belgium, but now of Church, in the county of Lancaster, gentleman, for his invention of improvements in manufacturing iron.—Sealed 20th October—6 months for inrolment.

To Henry Robinson Palmer, of Great George-street, Westminster, civil-engineer, for his inventions of improvements in giving motion to barges and other vessels on canals.—Sealed 20th October—6 months for inrolment.

To John Frederick Grosjean, of Soho-square, in the county of Middlesex, musical instrument maker, for his invention of certain improvements on harps, which improvements are applicable to other musical stringed instruments.—Sealed 20th October—6 months for inrolment.

To Miles Berry, of the Office for Patents, Chancery-lane, in the county of Middlesex, civil-engineer, mechanical draftsman and patent agent, for certain improvements in the preparation of palm oil, whereby it is rendered applicable to the woollen manufactures, lubricating of machinery, and other useful purposes, to which it has not hitherto been applied, being a communication from a foreigner residing abroad.—Sealed 26th October—6 months for inrolment.

To Miles Berry, of the Office for Patents, Chancery-lane, in the county of Middlesex, civil-engineer, mechanical draftsman and patent agent, for certain improvements in machinery, for heckling or combing and preparing and sewing hemp, flax, tow, and such other vegetable fibrous substances, being a communication from a foreigner residing abroad.—Sealed 26th October—6 months for inrolment.

CELESTIAL PHENOMENA, FOR NOVEMBER, 1837.

D.	H.	M.	
1			Clock after the sun, 16m. 16s.
—			☽ rises 10h. 53m. M.
—			☽ passes mer. 2h. 20m. A.
—			☽ sets 5h. 41m. A.
	9	4	♀ in conj. with the ☽ diff. of dec. 2. 17. N.
2	16	56	♃'s first satt. will im.
4			Occul. (170) Capri, im. 8h. 26m., em. 9h. 28m.
5			Clock after the sun, 16m. 14s.
—			☽ rises 2h. 12m. A.
—			☽ passes mer. 6h. 18m. A.
—			☽ sets 10h. 35m. A.
—			Occul. 35 Capri, im. 6h. 6m., em. 7h. 6m.
	2	24	☽ in □ or first quarter.
6			Occul. f Aquarii, im. 10h. 46m., em. 11h. 24m.
	12	47	♅ in conj. with the ☽ diff. of dec. 3. 25. N.
7			Occul. ψ Aquarii, im. 6h. 37m., em. 7h. 43m.
	5		☽ in Perigee.
8			Occul. q Piscium, im. 4h. 7m., em. 4h. 25m.
10			Clock after the sun 15m. 54s.
—			☽ rises 3h. 25m. A.
—			☽ passes mer. 10h. 26m. A.
—			☽ sets 4h. 22m. M.
			Occul. 54 Ceti, im. 7h. 41m., em. 8h. 46m.
11	15	2	♃'s third satt. will em.
	20	32	♄ in conj. with the sun.
	—		Occul. π Arietis, im. 11h. 2m., em. 11h. 45m.
		2	Occul. p² Arietis, im. 14h. 52m., em. 15h. 52m.
12	11	30	Ecliptic oppo. or ○ full moon.
13	13	17	♀ greatest hel. lat. S.
	20		♅ stationary.
14			Occul. C Tauri, im. 17h. 57m., em. 19h. 2m.
15			Clock after the sun, 15m. 12s.
—			☽ rises 5h. 47m. A.
—			☽ passes mer. 1h. 59m. M.
—			☽ sets 11h. 6m. M.
16			Occul. c Geminorum, im. 17h. 30m.
17			Mer. R. A. 15h. 13m. dec. 17. 45. S.
—			Ven. R. A. 18h. 40m. dec. 25. 45. S.
—			Mars R. A. 17h. 9m. dec. 23. 47. S.

D.	H.	M.	
17			Vesta R. A. 22h. 50m. dec. 16. 31. S.
—			Juno R. A. 15h. 40m. dec. 10. 13. S.
—			Pallas R. A. 1h. 52m. dec. 24. 56. S.
—			Ceres R. A. 5h. 28m. dec. 21. 0. N.
—			Jupiter R. A. 11h. 8m. dec. 6. 42. N.
—			Saturn R. A. 15h. 14m. dec. 15. 56. S.
—			Georg. R. A. 22h. 27m. dec. 10. 33. S.
—			Mercury passes mer. 23h. 30m.
—			Venus passes mer. 2h. 55m.
—			Mars passes mer. 1h. 24m.
—			Jupiter passes mer. 19h. 20m.
—			Occul. λ Cancri, im. 8h. 8m., em. 8h. 48m.
	3	22	☿ in conj. with ♄ diff. of dec. 1. 53. S.
18	15	11	♃'s first satt. will im.
	15	34	♃'s third satt. will im.
	18	9	☿ in the descending node.
19	18		☽ in Apogee.
20			Clock after the sun, 14m. 10s.
—			☽ rises 11h. 35m. A.
—			☽ passes mer. 6h. 9m. M.
—			☽ sets 1h. 37m. A.
	6	34	☽ in □ or last quarter.
21	5	43	♃ in conj. with the ☽ diff. of dec. 2. 13. S.
	14	2	♃'s second satt. will im.
22			Occul. η Virginis, im. 14h. 22m., em. 15h. 25.m.
24	11	2	☿ in Sup. conj. with the sun.
25			Clock after the sun, 12m. 47s.
—			☽ rises 4h. 25m. M.
—			☽ passes mer. 9h. 35m. M.
—			☽ sets 2h. 32m. A.
	17	5	♃'s first satt. will im.
26	13	27	♅ in □ with the sun.
	15	3	♄ in conj. with the ☽ diff. of dec. 4. 49. N.
27	18	10	☿ in conj. with the ☽ diff. of dec. 2. 48. N.
	21	31	♀ in Aphelion.
28	1	50	Ecliptic conj. or new moon.
	16	36	♃'s second satt. will im.
29	3	37	♂ in conj. with the ☽ diff. of dec. 3. 46. N.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR SEPTEMBER AND OCTOBER, 1837.

1837.	Thermo.		Barometer.		Rain in inches.	1837.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low.	High.	Low.			Hig.	Low.	High.	Low.	
Sept.						Oct.					
26	60	30	30,20	30,12		11	63	49	30,31	30,26	
27	60	29	30,06	30,01	,0125	12	63	43	30,41	30,33	
28	62	39	29,99	Staty.		13	66	35	30,50	30,44	
29	61	30	29,98	29,95		14	55	33	30,55	Staty.	
30	64	30	29,90	29,89		15	56*	18	30,52	30,45	
Oct.						16	56	35	30,36	30,28	
1	65	42	29,89	29,86	,025	17	55	31	30,18	30,09	
2	68	51	30,09	30,03	,025	18	59	46	30,13	30,03	
3	70	49	30,08	29,99		19	57	32	30,31	30,22	
4	68	56	30,02	29,92		20	63	40	30,55	30,35	
5	65	45	30,13	30,11		21	59	39	30,48	30,44	
6	65	53	30,01	30,00	,225	22	59	38	30,36	30,24	
7	63	42	30,13	30,09	,0625	23	59	49	30,00	29,75	
8	63	45	30,10	30,04		24	54	47	29,56	29,49	,285
9	59	44	30,19	30,14	,05	25	47	32	29,92	29,53	,3
10	62	40	30,25	30,20							

* The thermometer on the morning of the 15th, remarkably low.

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

THE

London

JOURNAL AND REPERTORY

OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. LXIX.

Recent Patents.

To John Heathcoat, *of Tiverton, in the county of Devon, lace-manufacturer, for his invention of a method or methods of weaving or manufacturing divers kinds of goods and wares, and for machines or machinery applicable thereto.*—[Sealed 23d December, 1835.]

This invention consists of new and improved mechanism and arrangements of machinery, whereby different articles, such as tapes, ribbons, edgings, and other narrow fabrics, may be manufactured with increased dispatch, and in less room or space than by the machinery in common use for such purposes.

The chief point in which this improved method of weaving narrow fabrics differs from those commonly adopted, is, that the operation of weaving is performed in a transverse direction, that is, at right angles to the back and front of the machine, the tapes or other

narrow fabrics standing edgewise ranged side by side, their faces being parallel to each other, and to the ends of the machine; whereas, in the ordinary methods of weaving, the weft threads are laid in or inserted between the warp threads longitudinally, in directions parallel to the front of the machine. The machinery for effecting this object admits of modifications, in order to produce the different articles which may be required; but as the chief feature or principle of my invention will not be changed, although its application be modified, I do not limit myself to the particular forms and constructions of the several parts of the mechanism which I shall describe. For the illustration of my invention, however, I now proceed to explain one method of applying the same in the production of narrow tapes or ribbons.

Plate VI., fig. 1, represents a portion of the front elevation of the machine; fig. 2, is a vertical section, taken transversely; and fig. 3, is an end view of the machine arranged for weaving tapes or ribbons: A, A, are end standards for supporting the machinery secured to the floor by their feet, and braced together by stays at the top; B, is the driving shaft, which derives its movement from any first moving power, by means of a strap acting upon its pulleys; and C, is the vertical shaft at the end of the machine, geared to the former by bevil wheels. Upon these two shafts are fixed the different wheels, cams, or cranks, which actuate the other parts of the machine; D, is the roller on which the warp threads are wound; E, E, E, is a series of guide plates, through the holes of which the said warp threads pass, and by which they are divided into sets, each set being conducted in a range standing at right angles to the axis of the warp roller: F, F, are a number

of slender plates to act as headles, placed close behind each other, and extending along the length of the machine; through apertures formed between these plates the warp threads are conducted, and by their lateral movements, portions of the thread are carried to the right and to the left, for the purpose of crossing and opening the sheds of the warp for the passage of the shuttles. In order to make these openings between the different sets of warp threads wider and more distinct, a series of flat points or teeth G, G, G, is pushed forward through them, and then raised upwards about three inches, whereby the threads are disentangled from each other; for distinction, I call this part of the machine the rake; H, H, H, are the shuttles (one of which is shown in different positions in fig. 4,) on the bobbin of which the material is wound to form the weft, and which weft they are intended to carry through the respective sets of warp threads after the said threads have crossed each other; these shuttles slide on curved bolts from side to side across the machine; I, I, is the slay or reed for beating up the work, of which the slips or divisions are broad thin plates, put together so as to leave sufficient space between them for the warp threads to pass through, and to admit of their lateral movement; K, K, are a row of stationary pins or guides, for the purpose of keeping the work parallel with the shuttles, whilst the weaving goes on; L, is a small roller for preserving the face of the work in a line, and M, the work roller upon which, and close beside each other, the finished tapes or narrow ribbons are wound.

From the foregoing general notice of the principal parts of the machine, and their relative positions, it will be seen wherein the arrangement in my method of weaving narrow fabrics differs from the methods in

common use, and that a great diminution of the space usually occupied ensues therefrom.

It is now necessary to describe how the various operations above alluded to may be performed, and the mechanism which is capable of accomplishing the same.

Let it be supposed that the cotton, silk, or other material for the warp has been wound upon the warp roller D, the threads conducted from thence through the guides E, E, the headles F, F, the divisions of the slay I, I, the upper guides K, K, and secured to the work roller M, the first movement required, will be to cross the sets of warp threads laterally by means of the headles; each of these headles I make of two long thin strips of brass or tin, rivetted or soldered together with oval thickness pieces or counters between them at proper intervals, (as shown detached in several positions at fig. 5,) so as to leave openings for the threads between each pair of counters; the headle plates lie one behind the other, adjusted so that their respective apertures shall be exactly opposite one another across the machine, and slide lengthwise in bearings N, N, attached to the standards, and confined between longitudinal bars.

For plain weaving, the headle plates are divided into two sets, carrying the alternate threads of which, at their right hand end, one set has ears or pieces projecting upwards, and the other set downwards; these two sets of ears are jointed to the links O, O, by pins, whilst the opposite ends of the two said links are jointed to the lever P, one link above and the other below its fulcrum: wheels or studs on the two ends of this lever, work against the two cam wheels Q, Q, fixed on the vertical shaft C; which cams (shown detached at fig. 9,) are so formed, as by their revolution to give at the proper time an alternating movement to the lever,

and, consequently, to the headles, whereby half the latter are pushed in one direction, whilst the other half are pulled in the opposite one, and *vice versa*: for better illustrating this movement of the headles, I have shown it apart in fig. 6. The threads forming the warp of each respective tape or ribbon having been thus made to cross each other, the flat points of the rake (one of which is shown in two positions detached in fig. 7,) are advanced through the openings just above the headles, and then made to ascend about three inches, for the purpose of disentangling the threads, and thus preparing the way for the shuttles. To effect this movement, the bar of the rake has two stems R, R, descending and connected by joints to the levers S, S, which bear upon the cam wheels T, T, and receive an upward movement from the said cams as they revolve. It will be seen, also, that the upper parts of the rake stems carry small studs, which slide within the obtuse-angled channels or grooves U, of brackets fixed to the standards. Now, as the cams T, T, in revolving, cause the stems of the rake to rise, the rake itself is forced by the studs confined within the lower parts of the grooves to advance through the threads at the commencement of its movement, and then to rise perpendicularly; thus, the flat points of the rake straighten the threads, and clear the openings between them for the passage of the shuttles: this done, the cams T, T, allow the rake to descend out of the way of the shuttles; the slay (whose movement will be described forthwith) is allowed to do the same; and whilst this takes place, the shuttles enter between the threads, and commence their passage across the machine to lay in the weft.

Duringt he completion of this passage, the slay gradually begins to re-ascend, the headles again carry back

the warp threads, causing them to cross each other; and the rake recommences its functions, so that the opening of the warp threads may be ready for the return of the shuttles.

An enlarged view of one of the shuttles is shown in fig. 4; the bobbins for containing the weft may be made of brass or other metal, so as to turn in grooves within their carriages, the threads being kept at the required tension by means of curved springs, capable of adjustment. It will be seen that there are curved grooves on the sides of the carriages, in order to enable them to slide upon the bolts V, V, which are cast in leads, and screwed to the bars W, W; the carriages have also mortices in their upper parts, designed for receiving the ends of the small fingers or hooks X, X, cast also in leads, and screwed to other bars Y, Y, whereby they are alternately pushed and pulled along the curved bolts from back to front, and front to back of the machine: the bolt bars W, W, and the finger bars Y, Y, are suspended by arms at their ends, from the studs Z, Z, screwed to the standards of the machine upon studs, the said bars being capable of vibrating. The arms which suspend the outer bars or finger bars Y, Y, have, towards their extremities, studs *a*; by means of which, and the links *b*, *b*, they are connected with the projecting arms of the lever shafts *c*, *c*. These lever shafts have each an arm *d*, *d*, at the end of the machine, next the vertical shaft of which the two extremities bear against the cams *e*, *e*, fixed upon the said shaft; these cams, represented detached and in plan view at fig. 8, are so shaped, as at suitable times, and through the medium of the lever shafts, links, and studs, to give alternate vibrations outwards and inwards to the finger bars and fingers, for moving the shuttles to and fro. On the ends of the

finger bars, which are mounted on studs, and are capable of turning in the arms which suspend them, are affixed small pieces, carrying anti-friction rollers *f*, *f*, which, as the said bars vibrate, slide backwards and forwards within the grooved pieces *g*, *g*, attached to the bolt bars; and, from the form and direction of this groove, the ends of the fingers are forced downwards at the commencement of its outward movement, and after completing the same on its return, it is, by the same groove, forced upwards again to the same position.

Now, by the alternate movement of eachbar caused by the cams *e*, *e*, it will be perceived that one set of fingers or hooks x, x, will descend into the mortices of the shuttles, and draw them along just as the other fingers are liberated therefrom, and *vice versa*; thus the shuttles are moved alternately from front to back, and from back to front, of the machine, and thereby the weft threads are conducted between the respective sets of warp threads.

The next operation required, is that of beating up the weft by the slay or reed I; this slay or reed I make of a number of straight slender brass or other plates, which are held between two light iron bars, secured firmly together at their ends: it is necessary also, at intervals, to insert pins, fastened in slips of brass, between the plates or divisions of the slay, to preserve their parallelism. The slay, thus composed, is mounted upon two crank rods *h*, *h*, by its ends, and derives its movements from the cranks *i*, *i*, on the driving shaft, which, by their revolutions, alternately elevate and depress the slay by which the work is beaten up. Upon the ends of the slay frame are studs and oblong sliding pieces, which slide in the groove within the cheeks *j*, *j*, attached to the standard, by means of which the move-

ments of the slay are preserved in nearly perpendicular directions; of course, the number of the plates constituting the reed, like the headles, must depend upon the number of warp threads required, and the width and quality of the article to be produced, there being as many headle plates as warp threads in each tape, but only half as many divisions in the slay. I may also add, that the number of shuttles (and consequently of tapes or ribbon) must depend upon the width of the machine and the width of each tape, which I prefer to wind close beside each other on the work roller, so as to occupy all the surface of it.

I have before observed, that the bolt bars W, W, as well as the finger bars, are capable of vibrating, in order to make way for the slay to pass between the bolts V, truck wheels *k*, *k*, upon the two ends of the slay frame, press, as it ascends, against inclined pieces *l*, *l*, attached to the bolt bars, and thus force them outwards sufficiently to allow the slay to pass between the ends of the bolts; the slay frame, in descending, allows these bars to collapse again.

Here I would observe, that as the bevil wheels, which connect the driving shaft B, with the vertical shaft C, are in the proportion of one to two, the cranks on the former make two revolutions for one of the cams on the latter; thus the slay makes two beats during the alternate motions of the headles and shuttles which forms the routine of the operation. The tapes or ribbons produced, are passed through the guides K, K, which preserve them parallel with the shuttles; they are then allowed to turn into the same plane as the axis of the work roller, by the small roller L, and afterwards received, side by side, upon the surface of the work roller.

It only remains for me to explain how motion is imparted at intervals to the warp and work rollers, in order to furnish the necessary portion of warp, and to wind up the work as it is made. On the ends of these two rollers, there are worm wheels gearing into corresponding worms on the small transverse shafts or spindles *m, m*; these shafts have affixed at their ends fine ratchet wheels: there are also levers *n*, mounted loosely upon the said spindles, carrying pawles or clicks *o*.

Upon the vertical shaft c, is fixed a double tappet wheel *p, p,* which, in revolving, elevates the lever *q*, bearing upon it. A bolt or rod *r*, sliding in bearings or sockets against the end of the machine, receives its vertical motion from this said lever *q*, and at the same time, by means of projecting pieces or ears, lifts up the pall levers *n, n,* and thus causes a slight movement to the two ratchet wheels, which is imparted to the two rollers; there being two tappets on the wheel *p*, this slight motion is produced after each beat of the slay: thus, one roller gives off a portion of the warp, whilst the other winds up the work made. In order to provide against the irregularity of the texture of the work, which would be occasioned by the increasing diameter of the work roller, I apply what may be called a regulator; this consists of an L-shaped lever *s*, one leg of which carries a small roller bearing against the face of the tapes on the work roller, and the other leg supports a bolt *t*, which slides against the standard. From this bolt projects a piece, which serves as a stop for the gauge screw of the upper pall lever *n*, to drop upon.

Now, as the work roller increases in diameter, the lever will raise the bolt and stop; and by shortening the space through which the pall lever and ratchet wheel moves, lessens the quantity of motion imparted to the

work roller. By this contrivance, the fabric is preserved of uniform texture.

Having thus shown the application of my invention to the production of plain tapes or narrow ribbons, and described the mechanism I use for that purpose, I do not consider it necessary to enter into the various modifications of which it is susceptible, in order to adapt it to the manufacture of other narrow fabrics and small wares.

In the production of ornamented or fancy fabrics, it may be found necessary, where different portions of the warp shall be required of different thicknesses, or different degrees of tension, instead of one warp roller to employ several; the headles, also, instead of being divided into two sets, each half of them moving together, require (for some patterns) a separate and independent movement for each headle, according to the peculiar formation of such patterns, the cams or tappets, commonly called the cut of wheels, being made to produce such particular device. In this case it will be found necessary to place the cam wheels, which actuate the headles, upon an extra spindle or shaft, whose rotation shall be as many times slower than the driving shaft, as there are beats or picks in the whole course of the pattern to be produced.

These and other modifications or combinations my new method of weaving narrow fabrics may undergo, and still retain the essential features of my invention, viz. of performing the operation of weaving many narrow fabrics or small wares together, the weft being inserted or laid in transversely, or at right angles to the back and front of the machine; therefore, I do not limit my claim to any one of such modifications.

In conclusion, I do not claim as new all the respec-

tive parts of the machinery above described, but the arrangement and combination of the same for the above-mentioned purpose, viz. for giving effect to my new method of weaving narrow fabrics, as above described.—[*Inrolled in the Rolls Chapel Office, June, 1836.*]

To Thomas Lutwyche, *of Liverpool, in the county of Lancaster, manufacturing chemist, for his invention of certain improvements in the construction of apparatus used in the decomposition of common salt, and in the mode or method of working or using the same.*—[Sealed 13th October, 1836.]

These improvements are designed to prevent the muriatic acid gas from escaping into the atmosphere, during the decomposition of the salt, which is effected by condensing such gas in suitable apparatus. It is also intended to carry on the process or manufacture in a more advantageous manner than it can be done by the apparatus now in common use, at the same time saving a large portion of the gas so condensed in the form of muriatic acid.

The apparatus usually employed for the decomposition of common salt with sulphuric acid, consists either of iron cylindrical retorts, or of open furnaces composed of brickwork. When the former is used, the heat is applied externally, by a fire under the bottom of the iron retort; and the object to be obtained in this mode, beyond the making of the sulphate of soda, is to collect the muriatic acid, which is effected by receiving the gas evolved during the operation, into double-necked jars or carboys, connected together at their upper parts, and

to the retort, by earthenware pipes with proper luted joints. But when the latter mode is used, the principal object is to obtain the salt cake or sulphate of soda of a better quality, and in a more perfect state than when made in close iron vessels; by which process, the fire and flame is allowed to play directly upon the materials under operation, and the gas is allowed to escape up the chimney into the atmosphere.

Imperfect decomposition of the salt, impurity of the acid, and difficulty of condensation, attends the first of these methods; and, by the second process of operation, viz. decomposing in the open or reverberatory furnace, the immense volumes of muriatic acid gas and other deleterious vapours, which are disengaged or discharged into the atmosphere, become a public nuisance.

The improved construction of apparatus for the decomposition of common salt and the condensation of the muriatic gas, consist, first, in a novel and peculiar construction of closed oven, or decomposing chamber, with its fire-places and flues composed chiefly of bricks and mortar. Within this oven or decomposing chamber, there are two beds or floors, one about six inches lower than the other; and over them is formed an arch of fire bricks or of fire tiles placed obliquely: which arch separates the oven or chamber from the fire, and prevents the flame and smoke coming into contact with the materials under operation, but admits of sufficient heat for the purpose of decomposition.

By this arrangement, the muriatic acid gas evolved from the salt and sulphuric acid, is separated from the smoke and gaseous products arising from the combustion of the fuel, and, consequently, is the more easily condensed. A second arch is formed over the first, or fire tiles are placed obliquely or horizontally, thereby

forming the flue or flues; and one or more fire-places are placed at the end of the decomposing chamber. The salt and acid are placed together on the lower bed of the chamber, in the side of which there are two doors, one near the centre of the bed, the other close to its end next the upper bed, for the greater convenience of moving the charge from the lower into the upper bed, when the materials become sufficiently stiff to allow of this being done, which generally takes place in a few hours.

A fresh quantity or charge of salt and acid are put into the lower bed, when that last introduced is changed to the upper; and at the expiration of ten or twelve hours from the commencement of the operation, the sulphate of soda in the upper bed may be drawn out, when another removal of partially decomposed salt takes place, and a fresh charge is put into the lower bed; so that although the materials are kept in the furnace ten or twelve hours, yet a fresh charge of salt and vitriol are put into the lower bed, and the decomposed salt or sulphate of soda is drawn out of the upper bed every five or six hours.

Figs. 10 to 16, in Plate VI., will serve to further illustrate these improvements in the construction of apparatus. Fig. 10, is a perspective representation of the decomposing furnace and condensing apparatus as seen looking toward the front of the fire-places; fig. 11, is a similar representation looking at the side of the furnace; fig. 12, is a vertical section taken longitudinally through the furnace, to show the closed oven or decomposing chamber, fire-places, and flues; fig. 13, is another similar section taken transversely: *a, a*, is the brickwork of the furnace; *b*, the fire-places; *c*, the fire-doors; *d*, the ash-pits; *e, e*, the flues leading to the

chimney; *f, f*, the arch of fire bricks separating the flues from the oven or decomposing chamber *g, g*; *h*, is the lower floor or bed of the chamber, and *i*, the upper; *k, l*, are the charging doors for introducing the salt and acid, through the latter of which the partly decomposed salt is transferred to the upper bed or floor; and *m*, is the door for removing the sulphate of soda.

A slight variation of the foregoing is shown in figs. 14, and 15, which are similar sections to figs. 12, and 13, the same letters of reference being marked on corresponding parts, the only difference of construction being that the flues are in this instance separated from the decomposing chamber by means of fire tiles or fire bricks placed at an angle, instead of an arch or curve; and the top of the flues are made flat or horizontal. Fig. 16, is a longitudinal section of one of the condensing apparatus or troughs which will be more fully described hereafter.

The condensing apparatus consists of a trough or troughs, constructed either of stone, slate, or wood, or of any other material or materials which may be found best to resist the action of muriatic acid. Wood, well covered with boiled tar, pitch, or rosin, or a mixture of such substances, have been found to answer well; and the most convenient size is from about 9 to 12 feet long, by 3 feet wide, and from 12 to 15 inches deep: *o, o*, are the troughs within which conducting pipes *p, p*, formed of earthen or stone ware are introduced, as seen in the drawings.

A quantity of water sufficient to rise within a few inches of the mouths or apertures of the pipes *p, p*, is to be put into the troughs; and over the mouths of the pipes are inverted earthen or stone ware jars or vessels *q, q*. These inverted jars form water lutes or joints.

The gas is conducted from the furnace by pipes *r, r*, into the conducting pipes *p, p*, and is passed from vessel to vessel, until by the time it reaches the fourth or fifth jar, there is remaining little or no gas uncondensed, the interior of the jars allowing a sufficient surface of water exposed to the gas.

The last conducting or exit pipe *s*, is connected with a flue leading to the chimney, the draught of which contributes to bring the gas forward from the furnace, and assists the condensation.

To the bottom part of each of the conducting pipes *p*, small branch pipes or nozles *t, t*, are attached (see fig. 16): these nozles pass through the bottom of the trough, and any gas which becomes condensed in its passage, is allowed to drop into a jar or any suitable receptacle placed below. The water in the troughs may be changed as often as is found desirable; and if there be a good supply of water, and the acid be not required of any particular strength, it may be allowed gradually to receive a fresh supply of water upon the upper surface at one end of the trough, and may be drawn off from the bottom part at the other end; but if the acid be required for manufacturing purposes, the water may remain in the troughs until it acquires sufficient gravity, or until the fumes arising therefrom become inconvenient, or the condensation be impeded.

The Patentee concludes by saying, "Having thus described the nature of my invention, and the manner of carrying the same into effect, I would remark that I do not confine myself to the exact form and dimensions of the decomposing furnace shown in the drawing, nor in the construction of the arches, or the part which separates the fire-place and flues from the decomposing chamber, or the medium over which the fire passes, as

this medium may be of fire bricks or fire tiles, or other fit and proper materials, placed obliquely or horizontally, or in curved figures over the materials under operation for the formation of the sulphate of soda : nor do I confine myself to the size or number of the condensing troughs, jars, vessels or conducting pipes, the same being capable of modification, or being varied according to the quantity of salt required to be decomposed in a given time. But I claim as my said invention, the improved construction of decomposing furnace, with the mode of applying the fire through a medium of fire bricks, fire tiles, or other fit and proper materials, in the manner as before described; thus separating the muriatic acid gas from the smoke and gaseous products arising from the combustion of the fuel. And I also claim as my invention and improvements, the improved construction of condensing apparatus, and the *application* of the mode or method of conducting the muriatic acid gas in pipes under water, and inverted jars, as before described, in the said condensing troughs or apparatus."—[*Inrolled in the Rolls Chapel Office, April,* 1837.]

Specification drawn by Messrs. Newton and Berry.

To FREDERICK EDWARD HARVEY, *of the Horsley Iron-works, in the parish of Tipton, in the county of Stafford, mechanical draftsman, and* JEREMIAH BROWN, *also of Tipton, in the same county, roll-turner, for their certain improvements in the process and machinery for manufacturing metallic tubes, and also in the process or machinery for forging or rolling metal for other purposes.*—[Sealed 3rd February, 1836.]

THESE improvements in the process and machinery for manufacturing metallic tubes, and also in the process

or machinery for forging or rolling metal for other purposes, consist, first, as regards the manufacture of cylindrical tubes in preparing iron for skelps, by rolling it in a heated state to particular forms suited to the production of such tubes; secondly, in partially bending or turning over a portion of the edges at the end of each prepared skelp, by means of rolls having excentric and peculiarly formed grooves, and afterwards completing the bending of the whole length of the skelp (whilst still in a heated state) upon a stationary mandrel, between a pair of rollers having semi-circular grooves; or the same effect of bending may be obtained by passing the skelp through suitable forming moulds; and, thirdly, after again heating the skelp to a welding heat in a hollow fire or air furnace, closing or welding the edges or junctions of such bent skelp upon a stationary mandrel by the external pressure of a pair of grooved rollers, between which the skelp is made to pass.

Plate VII., fig. 1, represents the flat side and transverse section of an iron skelp A, prepared, by rolling, for forming a cylindrical tube to be closed at its edges when welded, by what is technically called a jump joint. Fig. 2, is another skelp, also prepared by rolling, shown in flat and sectional views, bevelled on its edges, and intended to be closed by what is called a lap joint. It is not necessary to show in the drawings, figures of rollers suited to produce these skelps, as the forms of the skelps being exhibited, the manner of producing them by rolling will be well understood.

Having prepared the skelp A, as shown at figs. 1, or 2, we introduce its end edgewise through a free passage between a pair of rollers B, B, having segment grooves formed by excentric or convolute curves, and tapering in width, as shown in the front elevation at fig. 3, and

in transverse section at fig. 4. The skelp A, is pushed forward in the free passage between the rollers B, B, until it arrives at a fixed stop; the rotation of the rolls in the direction of the arrows, will then bend inward the edges of the skelp, as shown by dotted lines in fig. 4, and cause the skelp to assume the shape represented at A, fig. 5, where it is just about to be discharged from the rollers.

We now introduce the bended end of the skelp between another pair of rollers B*, C, having semi-circular grooves as shown in front view at fig. 3, and in transverse section at fig. 6, passing the bent tubular end of the skelp on to a fixed mandrel D, placed in the grooves of the rollers. This mandrel D, is represented detached in two views at fig. 7; it is intended to be mounted in a frame, and firmly held by a thin arm or fin extending from its side, connecting it to the part or disc by which it is attached to the frame, and held as shown in the front view, fig. 3, or in any other convenient manner, observing that it must be made stationary in the centre of the grooves of the rollers. The rotation of the rollers B*, C, will now cause the skelp to be drawn forward, and by the pressure of the grooved rollers bearing upon it externally, and the resistance of the mandrel internally, the whole length of the skelp will be bent up nearly into a cylindrical form, leaving a small opening between the edges of the same, as represented in the longitudinal and sectional figs. 8, and 9, which exhibit the skelp, figs. 1, and 2, bent up ready for welding: observing, that as the bent-up skelp advances, the arm or fin which supports the mandrel protrudes the open space between the bent-up edges of the skelp, and there operates as a guide in keeping the edges parallel.

We have said that we can bend the skelps by con-

ducting them through forming moulds. To effect this, we put the flat skelp A, between a pair of parallel grooved rollers E, E, as shown in section at fig. 10, and insert the flat end of the skelp into the bell-mouth of the forming mould F, shown in a front view at fig. 11. In order to assist the passage of the skelp through the forming mould, it may be necessary to employ a slight pair of tongs; these may be inserted into the forming mould, by providing a straight groove or passage for them.

The internal shape of the forming mould cannot be very well shown in the drawing; it will, however, be sufficient to say that the mould should be made in two pieces, that is, divided longitudinally in the middle, and that the groove through which the skelp is to pass, should gradually curve from the flat mouth in front to the circular part behind, at which the skelp is discharged. A back view of the forming mould and the conducting rollers is shown in elevation at fig. 12.

In order to close and weld the joints of the tubes, we place them in a suitable hollow fire or air-furnace, for the purpose of bringing the metal to a welding heat from end to end; we then employ a pair of rollers G, G, having semi-circular grooves, and a stationary mandrel D, of nearly the same constructions, and fixed in a similar manner as described above at figs. 3, and 6, in reference to the bending. In this case, however, the arm or fin which supports the mandrel, must not extend so near to the rollers as in the former, it being required to close and weld the edges of the skelp upon the largest or swell part of the mandrel, as the welding operation cannot be done at that part from which the fin protrudes.

This welding mandrel is shown detached in two views, at fig. 13: *a*, is the swell or head which forms the resist-

ance when the welding takes place; *b*, is the point and conducting part; *c*, is the thin arm or fin which, by means of its block or disc *d*, screwed to the standard, holds the mandrel firmly in its place. Fig. 14, is a front elevation of the welding rollers, showing the position of the mandrel; fig. 15, is a transverse section of the same.

It is only necessary to say, that on withdrawing the skelp from the fire, it is to be immediately slipped on to the point of the mandrel and pushed along the guide, the opening between the edges of the skelp being opposite to the fin or arm which holds the mandrel. The rotation of the rollers now carries it forward, and the external pressure of the rollers, opposed by the swell or head of the mandrel *a*, within, causes the edges of the skelp to become closed and firmly welded together. The elongated part or rod *e*, extending from the head of the mandrel beyond the rollers, is merely intended as a guide to support the tube, and prevent its bending; but if it should be required to draw down the tube to a smaller diameter, then another swell or head *f*, may be affixed upon the rod *e*, as a second mandrel, and the tube be drawn between a second pair of rollers H, H, fig. 16.

We have above described our improved mode of making cylindrical tubes or pipes, the same mode of welding between rollers, with a fixed internal mandrel, will also apply to the making of tubes of other forms; as for instance, a triangular tube, shown in the transverse sections at fig. 17, which may be used for the rail of a tramroad, or for conducting steam or hot water in warming buildings; or the double tubes, shown in sections, at figs. 18, and 19, and longitudinally at figs. 20, and 21, may be closed by welding between grooved rollers with fixed mandrels, and afterwards may be cut

into sections transversely, for making chains. The same mode of welding between grooved rollers with fixed mandrels, is also applicable for hollow sash bars and stiles for windows, hollow rafters for hot-houses, hollow hand-rails for staircases, hollow copings for palisadings, and a great variety of other things for which bars may be rolled into forms or swaged; and after being bent up by hand or otherwise, require to be welded together: which mode of welding in its various applications, we also claim as part of our invention.

Our improvements in forging or rolling metal, apply principally to rolling rails for railways; in effecting which, we first spread out and elongate the billet of iron into the form shown in transverse section at fig. 22, by means of ordinary grooved rollers; we then further shape the billet by the operations of rollers with other formed grooves, successively bringing the billets into the shapes shown at figs. 23, 24, 25, and 26. When we have brought it to the shape represented at fig. 26, we further work it into the shapes shown at figs. 27, and 28, by means of mandrels or guides placed in the grooves of the rolls in the same way as described above in reference to forming the tubes: the effect of which mode of rolling or forging is, that the grain of the iron will be made to be in a different direction to the grain of rails prepared by the ordinary process of rolling.

Lastly, we desire it to be understood that the subjects claimed by us, under the above recited Letters Patent, are, first, the means employed for preparing, bending, and forming skelps for making cylindrical and nearly cylindrical tubes or pipes, as above described; secondly, the process of, and machinery for, welding tubes of whatever form, by means of pressure rollers in connexion with an internal stationary mandrel fixed

between the rollers; and thirdly, the method of forming bars to particular figures for various purposes, by rolling them upon a fixed mould or mandrel.—[*Inrolled in the Rolls Chapel Office, August,* 1836.]

Specification drawn by Messrs. Newton and Berry.

To William Burch, *of the Borough-road, in the county of Surrey, calico and silk-printer, for his invention of certain improvements in machinery for printing silk and cotton, net, or lace.*—[Sealed 23rd January, 1836.]

A mode of ornamenting lace by means of thick opaque paint, has been for some time practised; the paint being deposited by a pencil in thick drops, so as to fill up certain of the holes or meshes of the net, and thereby produce coloured spots set in regular order, forming patterns or devices. The object of the present patent appears to be, to effect the same by machinery which has heretofore been done solely by hand, consequently, to do it with greater expedition.

From the descriptive part of the specification, we can merely understand what the Patentee intends to do; but as to the construction of a machine capable of effecting the object, that appears to be utterly impracticable from the information furnished.

The lace net is to be distended in a frame by attaching its edges to tenter-hooks set all round the frame; it is then to be slidden into the printing machine upon a horizontal railway, and stopped at a certain point to receive the impression. A series of small loose pegs having blunt points are suspended in a frame, their po-

sitions being arranged, as we suppose, according to the intended pattern. The frame of these pegs or pins is mounted upon a lever, and works up and down by means of a treadle. The ends of the pins are to be in some way dipped into a sieve of colour, and then the frame is to be brought down upon the surface of the distended net, by means of the treadle lever. As the ends of the pins descends, many of them will pass through the holes or meshes of the distended net, but some will rest upon the cross threads of the net. In order, therefore, that every pin may pass into a mesh or hole, the frame is to be slightly struck at the side by a hammer, which will shake the loose pins off their bearing, and cause them all to drop into meshes or holes in the net. The bed of the press is then to be raised in some way, but for what purpose we do not erceive; and afterwards the pins being drawn up from the net, will leave the paint, ink, or colour which they carried, adhering to and filling up the several holes or meshes of the net through which they passed. The frame with the net is then withdrawn, and placed in a situation to dry, and another piece of net introduced in a similar manner, and operated upon in the same way.

An equally unintelligible arrangement of apparatus is proposed for printing narrow strips of lace, which is to be placed upon a polygonal drum as its carrying frame.

The Patentee says in conclusion, that he does not intend to confine himself to any particular construction of machinery for performing the above operation, but that he claims the use of any machinery which will deposit the opaque paint in the interstices of the net.—[*Inrolled in the Inrolment Office, July*, 1836.]

To HENRY HOPE WERNINCK, *of North-terrace, Camberwell, in the county of Surrey, gentleman, in consequence of a communication made to him by a foreigner residing abroad, for an invention of improvements in apparatus or methods of preserving lives of persons and property when in danger by shipwreck, by speedily converting boats or small vessels of ordinary descriptions into life-boats, and other apparatus or means applicable to the same objects.*—[Sealed 24th September, 1831.]

THE subjects of this invention are described under eight heads. First, a floating balloon, which being thrown out of the ship is intended to float to the shore, and conduct a rope by which persons on land may be enabled to communicate with those in the ship, and afford them assistance. This balloon is to be constructed by combining a number of bladders prepared in the usual way, and filled with air, within a hoop of light wood.

Second, an apparatus called a *Scaphander*, formed by enveloping Dutch reeds in cases of cartridge paper, which are to be coated or painted with wax and oil, and covered with an external oilskin or waterproof cloth. These are to be attached to the body of the person by strings to assist him in floating, much in the same way as cork floats are used.

Third, a safety vest or jacket without sleeves lined with Dutch reeds, and covered with a waterproof material as the preceding; which jacket being buttoned or strapped to the person, will allow of his floating safely.

Fourth, *impetus fluctuans*, or floating power, as it is denominated by the Patentee, which is formed by bundles of Dutch reeds, confined together in cylindrical

or square shapes, which are to be coated with waterproof cloth, and affixed to the sides and other parts of a boat to prevent it sinking.

Fifth, an escape buoy, a ring formed by reeds bound round a hoop, and covered with a waterproof cloth; to which several ropes are attached, in order that when thrown in the water, persons may then take hold of the ropes, and thereby save themselves from sinking.

Sixth, a drop intended to be suspended at the stern of the vessel, ready to be let down in case of need. This is formed by a hoop bound round with reeds, within which a person may support himself in the water; and it is kept in its position by a transverse elliptical frame, the lower part of which is weighted to preserve its perpendicularity, the upper part carrying a small red pendant as a signal.

Seventh, an intelligence bladder. This is a bladder of the largest size, which is to be filled with wind; and into its mouth is to be partially inserted and secured a waterproof cylindrical box or tube, in which a letter or other matter of communication is to be enclosed, in order that when the bladder floats to shore, the situation of the persons on board may be made known.

Eighth, attaching the apparatus called the scaphander to the harness of a horse, in order that he may swim safely to shore, carrying a person upon his back. —[*Inrolled in the Inrolment Office, March,* 1832.]

To Joshua Bates, *of Bishopsgate-street, in the city of London, merchant, for an invention communicated to him by a foreigner residing abroad, of improved apparatus or machinery for making metal hinges.*—[Sealed 15th September, 1836.]

This invention of improved apparatus of machinery for making metal hinges, consists in a peculiar novel or improved construction of apparatus or tool for turning over or shaping the projecting parts or tongues of the pieces of metal which form the knuckles of the two sides, butts, or wings of the hinge; the knuckles of the two parts, when placed together as in a complete hinge, taking into the spaces between each other, and forming the hinge joint: such improved construction of tool or mechanism being only applicable to the making or manufacturing of such hinges as are formed out of rolled sheet iron, or other ductile sheet metal.

The sheet iron, or other ductile plate metal, after being prepared by rolling or otherwise to the required thickness, is first cut into strips or narrow lengths of the required breadth to form the two parts of the hinge, and then operated on by proper shaped punches and dies or cutters, so as to cut or sever the plate metal into two pieces, having tongues or parts to form the knuckles projecting from their edges; and which pieces may either, before or after this operation, be severed by shears into the necessary lengths for the required size of the hinge, as are represented in figs. A, or B, of the accompanying drawing. (See Plate VII.)

The pieces of metal, being thus prepared by any of the well-known modes of cutting out or shaping metal, they are to be brought under the operation of the tool or mechanism hereinafter particularly described, for the

purpose of turning over or bending the projecting tongues or parts *a, a*, so as to form the knuckle joints of the hinge into the proper figure or shape, as shown in the face and end representations, figs. C, and D; thus forming the two sides or wings of the hinge, with their knuckles or joints, which are afterwards to be fitted to each other by filing or otherwise, and put together, and the centre pin or wire passing through them so as to form the complete hinge, as shown at fig. E, the screw holes being made at a subsequent operation. And, I would here remark, that the previous process, method, or operation, of cutting up the plate metal, so as to form the two sides of the hinge, as at figs. A, or B, and the after process of completing the hinge from the parts C, and D, does not form any part of these present improvements, or the subject of the above recited Letters Patent, the improved construction of tool or mechanism being only applicable to, and intended to perform the operation of turning over the tongues or parts of the two sides of the hinge, so as to form the knuckle joints; and I shall proceed to particularly describe its construction and operation.

Plate VII., fig. 29, is a side view or end elevation of the apparatus, in its position previous to commencing an operation; fig. 30, is a transverse vertical section of the same; fig. 31, is a plan or horizontal view, the lever handle and bending tools being brought up to the horizontal position, as when in the act of turning over and forming a knuckle joint; fig. 32, is a vertical section of the same; and fig. 33, is another section, showing the position of the parts after the bending tools and lever has been turned over and the knuckles formed.

The mechanism consists of a strong metal foundation plate *a, a*, firmly secured by bolts to the work-bench, and

has a projecting part or bed *b, b*, made of steel or other hard metal, furnished with a series of hooked pieces or fingers *c, c, c*, through which a hole or cylindrical aperture is bored, to receive the steel wire mandrel or pin *d, d*, which is passed through the whole length of the apparatus, and projects through the ends a sufficient distance to allow of its being withdrawn after each operation of turning over the knuckles. The outer ends of the part *b*, are formed into two hollow axes *e, e*, around which the other or moveable parts of the apparatus turn as their centre of motion. The tools or presses, which bend the tongues of the plate metal (*a, a*, figs. A, B,) over and around the mandrel or wire *d*, are shown at *f, f, f*, and are formed of steel or other hard metal projecting from a main plate or piece *g*, which has a sliding motion given to it backwards and forwards, for the purpose hereinafter described.

The plate *g*, is mounted in a framework of metal *h, h*, its inner extremities terminating in two adjustable bearings at *i, i*, which turn on the two hollow centre pins *e, e*: of the stationary part of the apparatus, the outer extremity of the frame *h*, is connected to a lever or handle *k*, by means of which the workman raises the bending tools, and turns them over with the tongues of the metal upon the mandrel in forming the knuckle joints. The other parts of the apparatus consists in the means of regulating the position of the bending tools *f, f*, with respect to the ends of the tongues of the pieces of metal to be operated upon, and also the means of gradually drawing inwards the said bending tools, as the tongues or pieces of metal are being turned over and wrapped around the mandrel so as to cause a travelling or rolling motion, instead of rubbing on the surface of the metal. The sliding motion of the bend-

ing tools *f*, and plate *g*, is effected by the edges of the plate being mounted in grooves in the side pieces of the frame *h*, or ribs projecting therefrom, and is connected by a bridle piece *l*, embracing an excentric roller *m*, turning in bearings in the side frame *h*, the bridle piece being connected to a bar *l*,* which carries the plate: one end or axis of the excentric is furnished with a lever or handle *n*, by means of which the advancing or retiring motion is given to the plate and bending tool on turning the excentric. The drawing in or advancing movement of the bending tools, when the apparatus is in operation, is effected by the following means:—On to the sides of the plate *g*, two curved or bent arms *o*, *o*, are affixed, each carrying a pin or stud *p*, which take into and work in excentric grooves *q*, *q*, formed in circular pieces *r*, *r*, fixed on to the piece *b*; and it will be clearly seen by inspection of the drawings, that as the lever or handle is turned over from the position shown in fig. 2, to that in fig. 5, the bending tools will by means of the excentric grooves *q*, and pins *p*, be made to follow the tongues of the piece of metal as they are wrapped round the mandrel or centre pin; the operation is as follows:—

A number of pieces of sheet metal having been prepared by punching or cutting them into the shape represented in figs. A, or B, or any other suitable figure, according to the size or nature of the intended hinge, they are to be placed by the workman side by side in the apparatus, the tongues or projecting parts being placed between the hooked pieces *c*, *c*, as shown by the portions at *s*, *s*, in the figures, the inner edges of the wings of the hinge being pushed up into the grooves or notches *u*, formed in the pieces *c*, *c*. The tongues of the sheet metal projecting horizontally under the

wire mandrel: and I may here remark, that the line of perforation through the fingers *c*, *c*, should be so much elevated above the top of the part *b*, as to allow the tongues of the piece of metal, while its wing part rests upon the surface of the bed plate, to pass horizontally under the mandrel but in contact with it, or nearly so, and should be placed about as far from the edge of the bed plate as it is raised above its level.

The piece of metal is then held tightly in this situation by forcing under it the wedge-shaped tool *t*, *t*, which brings the upper surface of the wing part of the piece of metal against the upper side of the grooves or notches *u*, (see fig. 30,) in the parts *c*; the excentric roller *m*, is then turned round, so as to force forward the bending tools until they press the tongues of the piece of metal against the mandrel wire. This being done, the operator lifts the lever handle from its suspended position, and turns it over clamp like towards the bed plate; in which operation the tools *c*, *c*, bend the tongues of the metal round the wire mandrel, and thus forms the knuckle joint; after which the excentric roller is to be turned back, when, by means of the bridle piece, it will withdraw the bending tools from the knuckle joints of the now partly-formed hinges, when the moveable part of the machine is to be again turned over to its suspended position. The wire mandrel is then withdrawn from the aperture, and the parts of the hinge taken out.

It will be seen that the outside surface of the knuckle thus turned round the wire mandrel, must be in the line of a circle, concentric to that described by the handle; when turned over to the bed plate, it follows that if the bending tools with their plate were also carried round extended as situated from the wire mandrel, in the direc-

tion of the radii of the same circle throughout their motion, the consequence would be, that as the tools bent the tongues round the wire, they would of necessity slide upon their surface, which would produce friction and flaws, if not break or elongate the parts, besides exposing the mandrel and machine to unnecessary strains: to avoid which, the ends of the bending tools, by means of the pins and excentric grooves, instead of sliding, are made to roll upon the tongues as it were from heel to point, their thickness being such as to give an extent of surface sufficient for the purpose, so that the line of pressure between them and against the wire shall advance equally upon the surface of each, as the lever handle is passed over to the bed plate, and in such manner that as the ends of the tongues are bent over to the surface of their own plate, the forward or extreme edge of the bending tools shall close down upon their edges, and finish the pressure.—[*Inrolled in the Rolls Chapel Office, March,* 1837.]

Specification drawn by Messrs. Newton and Berry.

To Abraham Adolph Moser, *of Canterbury-row, Kennington-road, in the county of Surrey, engineer, in consequence of a communication made to him by a foreigner residing abroad, for an invention of improvements in certain descriptions of fire-arms.*—[Sealed 15th December, 1831.]

This invention is intended to apply to fowling-pieces, muskets, pistols, and other hand fire-arms, the object being to set fire to the front part of the charge of gunpowder, in order that the powder may become entirely

ignited, which sometimes partially fails when the ignition takes place at the back part of the charge.

To accomplish this object, the priming is placed in a small detonating pellet attached to the back part of the disc of felt wadding, and the ignition of the pellet is effected by the point of a sliding pin passing through the charge of powder; which pin is projected into the detonating pellet in the wadding with considerable force, by means of a spiral spring let off by the trigger.

The mechanical construction of the lock appears to be considerably complicated; there is no cock or hammer, but the sliding pin, which moves in a guide tube. When the trigger lets go its hold, the force of the spiral spring shoots the pin forward, and after firing the piece, is brought back, and the spring put into tension by a lever near the guard.—[*Inrolled in the Inrolment Office, January*, 1832.]

To WILLIAM NEWTON, *of the Office for Patents, Chancery-lane, in the county of Middlesex, for improvements in the means of producing instantaneous ignition, being a communication from a foreigner residing abroad.* —[Sealed 11th August, 1836.]

THESE improvements, in the means of producing instantaneous ignition, consist in the peculiar construction of receptacles in which matches are to be placed, in order that on drawing out each match, it may become instantly ignited by the friction produced in its passage from the interior of the receptacle.

The principal feature of this improvement, is the manner in which two rough surfaces are placed nearly in contact, in connexion with the receptacle of the

matches. By this contrivance, the explosive end of a match, when the match is withdrawn from the receptacle, is caused to pass between the two rough surfaces, and, by means of the friction so produced, to become immediately ignited.

The match may be made of wood, paper, wax taper, or any other suitable material of which matches have usually or may be made; and they may be primed at the end with any of the known inflammable mixtures which become ignited by friction. I make no claim to any novelty in the production of matches.

The form of the receptacle for containing the matches may be varied according to taste; but the essential features of novelty in its construction, and that which constitutes the invention, claimed by me under the above recited Letters Patent, are as follows:—

I construct a box or receptacle having series of small tubes or compartments, each of which compartment is intended for the reception of one of the matches; and above these compartments I place strips of card, or other suitable substance, coated on their faces with sand paper, or other similar rough material.

The matches, having been properly primed, are severally placed in the compartments, their primed ends downwards, and the stems of the matches extending upwards between the rough surfaces of the strips of card, sufficiently far to allow of their ends being conveniently taken hold of by the finger and thumb for the purpose of being drawn out. The strips of card at top of the receptacle are then slightly pressed together and confined, in order that the primed ends of the matches, as they are severally drawn upwards out of the receptacle may, by passing between the rough surfaces, be sufficiently subjected to friction, to produce ignition by

the pressure of the rough sides of the cards acting upon the explosive priming.

The principles of the invention having been thus described, I will proceed to show a convenient mode of carrying them into execution.

In the accompanying drawings, Plate VIII., fig. 1, represents a series of tubes or receptacles for the matches, which receptacles are constructed of card. I first provide two flat pieces of card of a rectangular form; I then take another piece of card, crimped or corrugated or formed into flutes or tubes *a, a, a,* and attach it between the two former by glue or otherwise, as shown in the horizontal section fig. 2, and in the vertical section fig. 3; I then attach to the cards above the tubes strips of sand paper *b, b,* for the purpose of producing the required friction. I then introduce into each of the tubes a primed match, and after that has been done, bring the flaps, with the surfaces of the sand paper *b, b,* close to the stems of the matches, by binding thread round the flaps, or by any other convenient means, so as to confine them. When this is done, the matches being severally drawn out, the priming will by the friction, in passing between the sand paper surfaces *b, b,* become exploded and instantly ignite.

These receptacles for the matches may be made in various ways, and combined in various forms, without, in any degree, deviating from the principle of the improvement set out above. For instance, several of these series of receptacles with primed matches may be combined and enclosed within a small pocket-book, which will require merely to be opened and a match drawn out smartly, when the priming will instantly explode and the match become ignited. Such a small pocket-book, about two inches long, three-eighths of an inch thick, and two

inches deep, would enclose a series of receptacles capable of holding fifty matches; and when these matches are all used, the paper case of receptacles may be withdrawn; and on removing the binding threads so as to allow the flaps to open, as at fig. 3, a set of fresh matches might be introduced, and the flaps bound up again as before, when the apparatus would be ready for use.

A small box, as fig. 4, might be adapted to receive a quantity of the primed matches; *a*, being the receptacle for a store of matches to be set upright, the priming downwards; *b*, a socket for a wax candle; *c*, a recess, in which is mounted a pair of plates with roughed internal surfaces *d, d*, pressed together by a spring. Between these roughed plates *d, d*, a series of the matches are to be placed, the primed ends downwards; they may be readily introduced by pressing back the stud *e*, of the spring, which will open the plates, and when released, the spring will cause the plates to hold the matches firmly. When any one of the matches is drawn out, the priming in passing between the rough surfaces will, by the friction, become exploded and the match ignited.

Fig. 5, shows another box or receptacle for matches, the back and front fall down on hinges, for the purpose of introducing the matches into the receptacles *a, a*; and *b, b*, are the friction surfaces. When the back and front are closed up, they are held fast by pins, pressed down and passed into sockets, which confine them; and the matches on being severally drawn out, explode by the friction in passing between the surfaces.

Fig. 6, exhibits another construction of box, in an octagon form, the sides of which *a*, fall down on hinges, for the purpose of introducing the matches into the receptacles *b*; the friction surfaces are at *c, c*, and the sides, when closed up, are confined by an octagonal

casing. The interior of the box may contain a spirit lamp, and a drawer below for a store of fresh matches.

These, however, are only shown as examples, as it will be obvious that the receptacles may be made in a great variety of tasteful forms, embodying the same principles of construction, viz. the cells, sockets, or receptacles for the matches, with the friction surfaces above.

Lastly, I would have it understood that I do not confine myself to any particular forms, or to any materials of which the receptacle shall be made; and as to the friction surfaces, I make them of sand paper, or of card or leather, or of any other suitable material coated with sand, or any other fine grit, attached to the surfaces by glue or other means.—[*Inrolled in the Rolls Chapel Office, February*, 1837.]

Specification drawn by Messrs. Newton and Berry.

To Daniel Ledson, *manufacturer, and* William Jones, *screw manufacturer, both of Birmingham, in the county of Warwick, for their invention of certain improvements in machinery for making pins, rivets, wood screws, and nails.*—[Sealed 22d December, 1831.]

This is a tremendously long specification, without possessing any features of novelty that we can discover. The invention may be considered to consist in the construction of two machines: the one for cutting off lengths of wire or rods for forming the shafts of pins, screws, or nails, and afterwards heading them by means of dies, which compress the metal to form the end of each shaft into a boss or knob; the other ma-

chine is for pointing the pins by means of a rotary file-edged cutting wheel.

These are the essential features of the pin-making machine, invented by Mr. L. W. Wright, and for which he obtained a patent, dated 15th May, 1824 (see vol. ix. of our First Series, p. 281). The only difference that presents itself in the present invention (if such it can be called) is, that the operations of cutting and heading are now proposed to be done in a distinct machine from that which is employed for pointing the pins, whereas, in the former instance, the whole operation of making the pin completely was effected in one machine.

The original invention being now well known, and perfectly explained in the specification above referred to, we shall only describe the present in a general way, not considering the subject in its recent form deserving of a very minute explanation, with drawings of its details, as they appear to be but slight variations only of the positions of the parts, corresponding in principle with the original plan.

The wire for forming the shaft of the pins, is passed into the machine horizontally between the tension or retaining pins, and is drawn forward a certain distance at each operation by sliding pincers, which distance is adjusted according to the required length of the pin. When the wire has been thus brought forward, a moving chap of a pair of cutters comes down and severs the length of wire. The piece of wire thus separated, constituting the shaft of the pin, is then held firmly by the pincers, and its forward end is acted upon by an advancing punch, which, operating as a die, compresses the end of the metal into the required form of head.

The operations of the machine are performed through the agency of a rotary shaft, upon which is a wheel

railways *b*; the framework *c, c,* supports the table and form of types when run in under the platen *d*; and the paper to be printed is laid upon the board and timpan *e,* above, and carried under the platen by straps, for the purpose of bringing it over the form of types ready to receive the impression.

The platen, as before said, is made hollow, that is, its under part has a recess which is covered externally by a thin flexible sheet of metal, and when the water within is submitted to pressure, the flexible sheet becomes swelled out, exerting that force which causes the impression to be given.

The operations of the machine are these; supposing the parts to stand in the positions shown in the figures, whilst the ink is applied to the form of types *a,* in the ordinary way, the paper to be printed is laid upon the timpan at *e,* the registering points standing up in the middle; these preparatory matters being done, the pressman applies his hand to the handle of the wheel or rounce *f,* and turns it round. A pinion on the axle of this wheel takes into a toothed wheel *g,* on the axle of a barrel; which barrel, by means of straps, carries the table and form *a,* forward under the platen. By a connexion between the table and the pulleys *h, h,* the advance of the table causes the pulleys to conduct the timpan with the sheet of paper under the platen *d,* immediately over the form as then situated.

At this time water is to be let into the hollow part of the platen, which is done by turning the cock *i.* Upon the axle of this cock there is a toothed segment, into which a rack at one end of an oblique rod or bar *k,* takes, and as the rounce or wheel *f,* goes round, a wiper connected to it strikes against and raises the oblique rod or bar *k,* and thereby causes the cock to

turn, and the water to flow from a pipe *l*, into the hollow platen, when, by the pressure obtained from a column of water of about ten feet high, the required force is exerted to give the impression.

This being done, the rounce or wheel *f*, is now to be turned the reverse way, when the power of a helical spring on the oblique rod or bar *k*, will bring the rod back to its former situation, causing the rack to turn the cock *i*, and to close the water way from the pipe *l*, and open a way to the discharge pipe *m*, by which the water runs out of the hollow platen; and slight springs carry up the flexible plate into the platen so as to set the table with the form and the printed sheet of paper free. The table is thus run back into its former position, the printed paper is removed, and the form again inked for another impression.

As the table recedes, a disc on the axle of the wheel *g*, acts upon a tooth at the end of a lever *n*, raising that end of the lever. The other end of this lever is connected to the register pins, and draws them down away from the timpan; but when a notch in the edge of the disc comes round so as to allow the tooth at the end of the lever *n*, to fall into it, then the register pins are forced up ready to place the sheet of paper to be printed.

The Patentee says in conclusion, "I do not intend to claim as my invention any of the parts of the machine described, nor do I mean to limit myself to the employment of any particular materials for constructing it, but I do claim the use and application of a flexible or elastic platen, in manner hereinbefore described, the application of pressure thereto in printing presses, copying presses, &c. &c. by means of a liquid or aeriformed fluid, in manner herein also described; and the arrange-

ment of the machinery or parts of the said presses for the purpose of applying such pressure of a liquid or aeriformed fluid to such flexible or elastic platen.—[*Inrolled in the Inrolment Office, March,* 1835.]

To William Bridges Adams, *of Long Acre, in the parish of St. Martin-in-the-Fields, in the county of Middlesex, coach-maker, for his invention of an improved construction of wheels for all kinds of carriages, in which springs are commonly used.*—[Sealed 13th March, 1835.]

The Patentee has fallen into the same error which has misled several patentees before him, conceiving that the draft of a carriage will be facilitated by giving elasticity to the spokes of its wheels, but finding that all previous attempts of this kind have failed, conceives that the fault lies in the form of the springs, not in the principle.

After, therefore, expatiating upon the defects of radial spokes, as well as those made in curved and elliptical forms, suggests, as the real thing necessary, that the spokes should be made of circular flexible hoops, observing that the efficient spring wheel should be so made that the elasticity should be alike in all parts of the circumference.

It is not necessary that we should follow the Patentee in all his reasonings, but merely explain the construction which he has proposed to effect his object; viz. by so forming his wheels as to afford that ease and gentleness of action in the body of the carriage, for which springs in general are applied to carriages.

Plate VIII., fig. 8, represents an elevation of the improved wheel; *a, a, a,* is the felloe or rim of the wheel, made by any required number of curved pieces of wood, accurately fitted together as the staves of a barrel. These are placed round a ring of steel as an inner tire, and are bound tight on the outer periphery by the ordinary tire or ring of iron, placed on to the felloe in a heated state, and shrunk thereon to keep the whole tight. To the inner part of this wheel four steel hoops *b, b, b, b,* are attached by bolts at equal distances apart; and the opposite parts of these hoops are made fast to the central box or nave, formed of iron plates in the shape of Maltese crosses, and filled up by wood. Through the centre of this box the axle of the carriage is to pass, and be fitted and secured in any of the most improved modes.

A wheel so constructed, it is presumed, will possess a slight degree of elasticity, that is sufficient to give way to any small obstruction on the road which it may pass over.

It is suggested that this construction of wheel will be particularly desirable on railways, as its elastic property will enable it to neutralize the effects of passing over ill-formed joints in the road; it is even considered that should the wheel by accident pass off the rail, its elasticity will have a tendency to throw it up on to the rail again.—[*Inrolled in the Petty Bag Office, May,* 1835.]

SCIENTIFIC COMMUNICATION.

ON THE TEMPORARY SECURITY OF FRACTURED PADDLE-WHEELS.

To the Editor of the London Journal of Arts.

SIR,—Many plans for the temporary security of various damaged parts of sailing vessels, such as sprung or fractured masts, spars, bowsprits, temporary rudders, &c., have, from time to time, been given to the public through your, and other scientific journals, by those to whom such accidents have happened, for the benefit of their brother navigators; and, in my opinion, it is the duty of every one to whom such misfortunes occur, to make known the means he has found of overcoming the difficulty by temporarily repairing the damage. There is many a man who, when sitting quietly in his cabin or parlour, can think of different ways of getting out of trouble; but the desirable thing is to have some scheme, and that an effectual one, at hand the moment an accident or breakage occurs, when all the commander's wits are wanted to attend to his vessel, to see that all hands are at their duty, in order not only to secure his ship, but to prevent further damage. At this time he most wants his inventive genius assisted; but his mind is too much engaged with the passing events to allow of his coolly inventing an eligible scheme, or at least the best possible expedient, which might at other times occur to him, to overcome his difficulty.

The captains and masters of sailing vessels have, as before stated, the advantage of the various suggestions and plans of their brother commanders, and which, I have no doubt, have been the means of saving many a valuable ship or cargo; but as yet, the marine engineer has not this advantage regarding the temporary security of any fractured or damaged parts of *steam vessels*, although the machinery of a steamer is as liable to accident as any part of a sailing vessel, and is, in truth, much more essential to her going. All machinery is liable to derangement; and as speedy reparation is most desirable; it, in my opinion, becomes the duty of every engineer who successfully overcomes for the time any breakage or

damage of an essential part of his engine, boilers, or paddles, to give the plan by which he has succeeded to the public, for their benefit when placed in similar difficulties.

It is in the hope of assisting a brother engineer at such a juncture, that I am induced to offer to your valuable pages the means I employed at the moment, when at sea, to temporarily repair a fractured paddle-wheel belonging to the Honourable the Trinity House vessel, the VESTAL, and which I found to answer well, and to last sound, not only during that voyage, but until we could conveniently run into port and repair in a workman-like manner.

The accident happened in one of our voyages round England and Scotland, and occurred to the starboard paddle-wheel, by a fracture through three of the cast-iron arms of the wheel near the boss. The accompanying sketch will fully explain the means employed to repair the damage.

Plate VIII., fig. 9, is a front elevation of the wheel; fig. 10, a side view, partly in section; *a*, is the engine shaft, *b*, the paddle-wheel, *c*, the boss, *d*, *d*, *d*, the points of fracture of the arms.

It being an object to effect such a secure splicing as would enable the ship to prosecute her voyage instanter, and to avoid the probability of weakening the boss or the arms, by drilling holes therein, I hit upon the expedient of having a wrought-iron ring *e*, *e*, hastily forged for the porpose, and indented to catch each feather or rib of the arms of the wheel (seen best in fig. 10). This I immediately had secured to the several arms by lashing, as at *f*; I then applied a piece of timber *g*, *g*, athwart the whole, well lashed securely with chocks *h*, *h*, *h*, in order to equalise the strain of torsion throughout. The whole was fixed in four hours, and continued firm during this voyage in some heavy weather, and was used subsequently until the service of the ship conveniently admitted a more substantial repair.

Your readers may perhaps smile at my using the lashing instead of the more engineer-like mode of screw-nuts and bolts: but, in the first place, I did not want to weaken the cast-iron by drilling holes therein; and, secondly the time taken up by the lashing was much less than would have been occupied in drilling holes and

fitting screw-nuts and bolts; and, furthermore, we had but few hands on board who could assist me in the one operation, but plenty who could properly effect the other.

In conclusion, I would remark, that in this case the engine or paddle-wheel shaft did not project through the boss, having no outer bearing on the timbers of the paddle-casing, as many paddle-wheels do; had this been the case, I should have placed two pieces of timber, one on each side of the shaft, instead of the one across the centre, as represented in the sketch.

I am, Sir, yours, &c.

G. PEARNE,

Engineer Hon. Trinity House Steam-yacht "Vestal."

SCIENTIFIC NOTICES.

FRANCE—SOCIETY FOR THE ENCOURAGEMENT OF ARTS.

REPORT CONTAINING THE REWARDS PROPOSED TO BE GRANTED FOR IMPROVEMENTS IN THE ART OF MAKING GLASS. BY M. DUMAS.

French industry, although so much improved and advanced in all that concerns the chemical arts, leaves still many very essential points in the manufacture of glass; and France has in this art found herself much behind many foreign countries. Your committee of chemical arts have, therefore, thought it their duty to call the attention of the society and of French workmen to these points. They have, then, the honour to propose to you the following prizes for 1838 and 1839:—

REWARDS DECREED FOR 1838.

Reward for making an Infusible Glass.

In delicate chemical experiments, it is indispensably necessary that tubes, retorts, &c., made of glass, should be able to support a red heat without any alteration. Up to the present time, the French glass-workers have not sent into the market either tubes or other chemical apparatus, made of glass, that were able to resist the

action of the fire to the same degree as the tubes and other chemical apparatus made by the German artisans. This glass, it appears, is formed of the following ingredients; viz. silicia, seventy-five parts; lime, nine; alumina, three; and potass, thirteen. The society will decree, in 1838, the reward of 4000 francs to any French artisan that will deliver to the society articles of this nature capable of resisting the action of fire as well as those sold in Germany. The cost must not be more than twenty-five per cent. above the price of tubes and other apparatus made in France in the ordinary manner.

Reward for making stained glass coloured in the mass or on both sides.

Glass of this sort is made in France at the present time, but in a very small quantity, and a very few different shades are sent into the market. In this manufacture the Germans are much in advance of us, and furnish the market with a variety of shades. In Germany may be seen articles in glass in which the beautiful red colour of the currant is found, and which has never been obtained by our French artisans. It appears that this colour is obtained by the employment of a small dose of sulphate of gold; also the purple tint in the mass is obtained by some preparation of gold. The society, without entering into details, propose a reward of 3000 francs for glass coloured in the mass, or stained on both sides, which equals, in beauty and the number of shades, the glass sent into the market from Bohemia.

Reward for painting and ornamenting articles of the goblet description made of flint glass.

The glass-houses of Bohemia send into the market articles of this description decorated with vitrified colours, and are put into the furnace, and which, in transparency, purity, and solidity, leave nothing to desire. This art is entirely new in France, as we are not in possession of an infusible glass which is the base of it. Independently of the glass resisting the action of the fire, which is the first point to be considered in this manufacture, there still remains to be found out the proper methods of applying the different colouring oxides, or the gilding, in a solid, brilliant, and econo-

mical manner. The price must not be more than thirty-three per cent. above the price of the Bohemian glass-houses.

The society propose, for a reward, the sum of 3000 francs, for the year 1838, to any French artisan who will bring into the market articles of the above description, decorated with colours burnt in, and capable of bearing a comparison, in all respects, with articles of this description coming from Bohemian factories.—*Translated from the Bulletin de la Société d'Encouragement pour l'Industrie Nationale.*

REPORT UPON DYEING CLOTH WITH PRUSSIAN BLUE. BY MESSRS. MERLE, MALARTIC, PONCET, AND CO., SAINT DENIS.

The process of dyeing woollen goods with Prussian blue has particularly attracted the notice of chemists for the last twenty years. The experiments which have been made in this science, by Messrs. Ramond, Sonchon, Chevreul, and by one of our colleagues, M. Dumas, have completely resolved the scientific question of fixing Prussian blue upon wool. Some of these experiments have been made upon so great a scale, as to leave no doubt as to the practicability of its general application. The question is then to know, if dyeing with Prussian blue can sustain a competition with indigo, as regards price, beauty, solidity, and duration. It would, doubtless, be a great service rendered to the country, to be able to use advantageously, an article that may be easily made in all places and in all weathers, instead of a substance which is an exotic, and of a high price. Such a result would be well worthy of the rewards of the society. According to the testimony of your president, M. C. Baron Thenard, and by that of many other gentlemen of celebrity and good faith, who have worn cloths dyed by the Prussian blue of Messrs. Merle, Malartic, Poncet, and Co., this dyeing process wears at least as well as indigo; and the seams and other parts of the clothes that are exposed to continual friction do not become white, although the cloth is dyed in the piece. According to the report of the beauty of the colour, the specimens sent leave nothing to be desired. The reflection of the colour gives a vivacity and purity of tone which is never met with in indigo

dyes, particularly in the clear shade. The chemical experiments that have been made with these specimens, have proved that the dye has really Prussian blue for its base, that it contained no indigo, that it was decomposable by caustic alkalies, but that it resisted very well the action of acids and of chlorine. Your commissioners, who have visited the establishment of Messrs. Merle, Malartic, Poncet, and Co., at St. Denis, have found it arranged for working upon a large scale. They have there seen pieces of cloth in the course of manufacture, and others entirely finished. These pieces appeared to them to be of a very fine colour, perfectly dyed, and the quality of the wool well kept. They have also been able to acquire proofs (by the register and correspondence that has been given to them) that this establishment works for commerce, and that business is carried on with many important houses in the cloth trade. In this state of things, the committee would have wished to be able to propose a reward of the first order, for Messrs. Merle, Malartic, Poncet, and Co.; but these gentlemen wishing to keep for some time longer the secret of their application of dyeing; and the statutes of the society not allowing any reward to be granted, except to a perfect and complete communication of the whole process, your committee feel bound to make honourable mention of them, in order to reserve to them all their rights for a more important reward, when they shall deem it expedient to make their process known.—*Signed, Bussey Reporter, Bulletin de la Société d'Encouragement.*

REPORT OF TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS.

February 14, 1837.

The President in the Chair.

"Description of Mr. Henry Guy's method of giving a true spherical figure to balls of metal, glass, agate, or other hard substance." Communicated by Bryan Donkin, Esq., V.P. Inst. C.E.

The method adopted by Mr. Guy, consists simply in applying to practice the principle, that if a ball can be made to revolve rapidly

in every possible direction, or in other words, if during such revolution its axis of rotation be constantly changing its angular position within the ball itself, whilst a grinding tool is applied to the surface of the ball, the most prominent parts of that surface will be first acted on by the grinder, and by continuing the operation the whole of the higher parts of the surface will be progressively ground off, and the ball will ultimately be left of a perfect spherical shape. Mr. Guy effects this by placing the ball betwixt the faces of two wooden chucks fixed to two lathe mandrels, such as are used in common turning lathes, with their axes exactly in a line with each other. A quick motion is given to the mandrels in the usual way by two bands, so applied that the mandrels are placed in opposite directions; the ball being compressed betwixt the chucks turns, notwithstanding the friction of the tool. The tool is a bar of brass or iron, with a conical hole near one end, the larger diameter of which is made a little larger than the diameter of the ball.

"On the Construction of Railways of continuous bearing, by John Reynolds, A. Inst. C.E."

The author states the conditions essential for a good railway to be as follows: 1st. That it should be the closest practical approximation to a perfect plane of perfect stability. 2nd. That it should be adapted to prevent or to neutralise the vibrations from the impact of imperfect cylinders rolling on imperfect planes. 3rd. That it should possess the greatest durability and the greatest facility of being repaired which are compatible with the above conditions. Mr. Reynolds proposes trough-shaped cast iron bearers, having rectangular bearing surfaces, the angular point being downwards. Thus a section of the bearing part of the rail across its length is a right angle, with its vertex downwards. By this peculiar shape the sustaining area is increased, a greater resistance to vertical pressure is consequently obtained, and the lateral stability of the rail is secured. The rails are to be laid in earth, ashes, or broken stone and gravel, and the sustaining surface of the earth may have any requisite density communicated to it by rolling or beating the

earth at the sides, so as to give it sufficient density to resist the pressure to which the rail is to be subjected. The mass being composed of materials which will not readily yield or slip away, will be incapable of further condensation by any subsequent pressure not exceeding that to which it had been originally subjected by the beaters or rollers acting at the sides.

The rails which Mr. Reynolds uses are of two kinds; rails wholly of cast iron, cast in one piece, and rails either of wrought or cast iron laid on a sill of wood, the wood being placed in a cast iron bearer of the shape already described. The rails, sills, and bearers in this latter construction, break joint with each other, and are held together by bolts passing through all three. Thus one continuous structure is formed throughout the whole line, and the fracture of the three parts in the same place is highly improbable. The vibrations will be neutralised by the sill of wood acting as a partially elastic cushion in receiving the concussion to which the rails are subjected; and this latter mode of construction is considered preferable as admitting of the use of either cast or wrought iron rails.

February 21, 1837.

BRYAN DONKIN, Esq., V.P., in the Chair.

The construction of railways onthe principle of continuous bearing, as adopted by Mr. Reynolds, and described in his paper read at the last meeting, was discussed. Some of the rails and bearers cast in a single piece, having been laid on Chatmoss inquiries were made as to how they had answered. It was stated that they were kept in order at less trouble than the others, and that they showed no tendency to sink. It was intended to use the commonest timber for the sills; the wood having been boiled in tar, and allowed to cool in the tar, becomes so saturated with tar that it will not imbibe moisture.

"A Steam Expansion Table, by George Edwards, M. Inst. C.E."

In the paper explanatory of this table, the author remarks, that it has become a matter of interesting inquiry, why the expansive

property of steam is as yet so little used, when attention has been directed so much to the economising fuel by improved boilers, and other similar means; and the more so as patents were taken out by Hornblower in 1781, by Watt in 1782, and by Woolf in 1804 for working steam expansively. The objections to the use of high pressure steam may perhaps be an obstacle; but there are many cases, as in the engines of tug boats, to which these objections cannot apply.

Very incorrect notions having existed of the expansive properties of steam, the author has, according to the admitted law, "that (the temperature being constant) the bulk is inversely as the pressure," constructed a table, showing at one view the resulting pressure on the expansion of a given volume of steam of given density, and *vice versa.*

Mr. Edwards then describes the construction and method of using the table, so as to answer at once questions similar to the following:—"Required, the pressure of 50lb. steam when expanded three times its volume." "In a high-pressure engine, working expansively, required the length of the stroke at which to cut off the steam, that the pressure may be 14lb. at the end of the stroke." "In a Woolf's engine, working 54lb. steam, required the capacity of the larger cylinder, the smaller being unity, so that the pressure of the steam shall be 4lbs. on the completion of the stroke of the large piston," &c. &c.

With respect to the principle on which this table is calculated, it was stated that the temperature does not remain constant, and that the pressure falls off most rapidly on the steam being cut off, and reference was made to some experiments made by Mr. John Taylor on this subject.

February 28, 1837.

The President in the Chair.

"On a peculiar form of Rail, and the construction of Railways in America and Germany, by Herman Koehler, of Leipzig M. Inst. C.E."

The pattern, which the author describes, is by American engineers called the inverted T rail (⊥), and was introduced in order

to avoid trouble and expense, which railways are liable to where the rails are placed in chairs and fastened with keys. The material used for this need not be of first quality, but in cases where it is expedient to support a general confidence in the quality of the iron, good and sound rails can be made of $\frac{5}{8}$ths of No. 2, Welsh iron, and $\frac{3}{8}$ths of No. 3, employing the better quality for the head and bottom, and No. 2 for the stem of the rail, rolled in such manner that the lamina of the iron lie horizontally throughout.

The experience of all railways seems to confirm the opinion that chairs and keys to keep the rails firm to their places are a great and expensive inconvenience, and a dangerous construction whether wood or iron be the material of the keys. The author then details the advantages of the rail, especially if laid on a continuous line of stone or wooden sleepers at a small distance apart.

Wooden railways are at this time used in Germany, and the author has laid 9 miles betwixt Leipzig and Dresden. Wooden sleepers, 8 inches square, are placed upon trenches cut across the embankment at every yard, and filled up with a bed of broken stones, one foot deep. Notches $3\frac{1}{2}$ inches deep are cut into these cross ties to receive the wooden rails of 6 by 9 inches, which are shod with iron plates of one inch thickness and $2\frac{1}{2}$ inches width. At their joints they put together on iron-plates $\frac{1}{8}$th of an inch thick, to prevent their being pressed into the wood. The rails are wedged firmly to the sleepers by wooden wedges. The head of the spikes with which the iron rails are fastened to the wood are of a conical form and fit into corresponding holes, these having an elliptical form to prevent the spike from being drawn or bent on the contraction and expansion of the iron rail. The ends of every iron plate rail are fastened with screw bolts, passing through the whole height of the wooden rails, firmly to their places, which is a very important precaution, as the engines are apt to catch the points of the plate rails with their wheel flanches and to run off.

"A drawing and description of a new Lewis, by Henry Robertson, Glasgow." Communicated by the Author.

The proposed Lewis consists of two pieces of iron, whereof each is a bent lever, connecting at a joint by a strong bolt. When the

upper or longer arms are drawn together by the power, the under or shorter arms inserted into the hole are forced against the sides, and, by properly increasing the proportion of the upper to the under arm, any necessary power may be given to the instrument.

The advantage of this Lewis as compared with the one of three pieces in general use are, that it can be inserted into and removed from the hole in far less time; it adapts itself to the form of the hole, all fitting and plugging with slips of iron being unnecessary, and exerting its pressure directly against the sides of the hole, is less apt to chip off the edges and endanger the falling of the stone.

"Experiments on the Strength of various kinds of American Woods exposed to a Transverse Strain; by Lieut. Denison, of the Royal Engineers, A. Inst. C. E."

These experiments were undertaken with the view of establishing, first, some common standard of comparison between the woods in general use in that country and in our own; and, secondly, to ascertain the change in strength caused by seasoning. The latter series of experiments, unfortunately, was not made.

List of Patents

Granted in Scotland since 23d November, 1837.

To Henri Quentin Tenneson, late of Paris, for an improved construction of the portable vessels used for compressing such gas therein, and of apparatus or mechanism for regulating the issue or supply of gas either from a portable vessel, or from a fixed pipe communicating with an ordinary gasometer; communicated by a foreigner.—28th October.

— James Matley, Paris, for a machine called a tiering-machine, upon a new principle, for supplying colours to and to be used by block printers in the printing of cotton, linen, and woollen cloths, silks, paper, and other substances and articles to which block printing is or may be applied without the aid or assistance of a person to tier.—4th November.

— Thomas Bell, of South Shields, manufacturing chemist, for

improvements in the manufacture of sulphate of soda, which improvements, or parts thereof, are applicable to other purposes.—4th November.

To John Joseph Charles Sheridan, chemist, for certain improvements in the several processes of saccharine, vinous, and acetous fermentation.—9th November.

— William Arthur, of Glasgow, machine-maker, for improvements in spinning hemp, flax, and other fibrous substances.—9th November.

— Hamer Stansfield, of Leeds, merchant, for the application to certain machinery of a tappet or lever action to produce a vertical or horizontal movement, through the medium of ropes or bands, working over, under, or round pulleys; as also a new arrangement of mechanism for throwing certain wheels in and out of gear; communicated to him by Christian William Schonberr, of Schereeberg, in the kingdom of Saxony.—20th November.

— Frederick Burt Zincke the younger, of Crawfurd-street, Marylebone, London, for the preparing or manufacturing of a leaf of a certain plant so as to produce a fibrous substance not hitherto used in manufactures, and its application to various useful purposes.—21st November.

— John Hanson, of Huddersfield, Yorkshire, leaden-pipe-manufacturer, and Charles Hanson, of the same place, watchmaker, for certain improvements in machinery or apparatus for making or manufacturing pipes, tubes, and various articles from metallic or other substances.—22d November.

— William Gilman, of Bethnal-green, engineer, for an improvement or improvements in steam-boilers, and in engines to be actuated by steam or other power.—22d November.

— To John George Bodmer, of Bolton-le-Moors, in the county of Lancaster, civil engineer, for certain improvements in machinery for spinning and doubling cotton, wool, silk, flax, and other fibrous materials.—22d November.

— Richard Burch, of Heywood, in the county of Lancaster, engineer, for his invention of certain improvements in manufac turing gas from coal.—22d November.

New Patents
SEALED IN ENGLAND,
1837.

To Joseph Whitworth, of Manchester, in the county of Lancaster, engineer, for his invention of certain improvements in locomotive and other steam-engines.—Sealed 2nd November—6 months for inrolment.

To Richard Burch, of Heywood, in the county of Lancaster, engineer, for his invention of certain improvements in manufacturing gas from coal.—Sealed 2nd November—6 months for inrolment.

To Joseph Lockett, of Manchester, in the county of Lancaster, engraver, for certain improvements in the art of printing calicoes and other fabrics of cotton, silk, wool, paper, or linen, separately or intermixed, being a communication from a foreigner residing abroad.—Sealed 2nd November—6 months for inrolment.

To James Gowland, of Leathersellers-buildings, in the parish of Allhallows in the Wall, within the city of London, watch and chronometer maker, for his invention of a certain improvement or certain improvements in the mechanism of time-keepers.—Sealed 2d November—6 months for inrolment.

To Richard Joshua Tremonger, of Wherwell, in the county of Hants, Esq., for his invention of an improved spring or arrangement of springs for wheel carriages.—Sealed 4th November—6 months for inrolment.

To John Upton, of New-street, Southwark-bridge, in the county of Surrey, engineer, for his invention of an improved method or methods of generating *steam-power*, and applying the same to ploughing, harrowing, and other agricultural purposes, which method or methods

is or are also applicable to other purposes, to which the power of steam is or may be applied.—Sealed 4th November—6 months for inrolment.

To Ernst Adolph Ortman, of Stockholm, in the kingdom of Sweden, now of Ebenezer-place, Limehouse, in the county of Middlesex, for his invention of a method or methods of freeing wholly or partially, wooden or other porous vessels from certain foreign matters or substances which they are liable to absorb, and of turning to a useful account the foreign matters or substances so liberated or extracted.—Sealed 4th November—6 months for inrolment.

To George Deakin Midgley, of the Strand, in the county of Middlesex, chemist, and John Howard Kyan, of Cheltenham, in the county of Gloucester, Esq., for their invention of an improved mode of extracting or obtaining ammonial salts from liquor produced in the manufacture of coal gas.—Sealed 4th November—6 months for inrolment.

To William Arthur, of Glasgow, N. B., machine-maker, for his invention of improvements in spinning hemp, flax, and other fibrous substances.—Sealed 4th November—6 months for inrolment.

To Tobias Michell, of Kingsland-green, in the county of Middlesex, gentleman, for his invention of improvements in washing and purifying smoke and vapours evolved from furnaces of various descriptions.—Sealed 7th November—6 months for inrolment.

To Thomas Hughes, of High Holborn, in the county of Middlesex, truss-maker, for his invention of an improvement in stocks, cravats, and stiffeners.—Sealed 7th November—6 months for inrolment.

To Charles Francois Edward Aulas, of 38, Grand Rue Verte, Paris, in the kingdom of France, but now

of Cockspur-street, in the county of Middlesex, gentleman, for a new and improved method of cutting and working wood by machinery, being a communication from a foreigner residing abroad.—Sealed 7th November—6 months for inrolment.

To Charles Francois Edward Aulas, of 38, Grand Rue Verte, Paris, in the kingdom of France, but now of Cockspur-street, in the county of Middlesex, gentleman, for an improvement or improvements in preparing writing-paper, so as to prevent the discharge of the ink therefrom without detection, and to prevent the falsification of writing thereon.—Sealed 7th November—6 months for inrolment.

To John Potter, of Ancoats, near Manchester, in the county of Lancaster, cotton-spinner, for his invention of an improvement or improvements in the process of preparing certain descriptions of warps for the loom.—Sealed 9th November—4 months for inrolment.

To James Slater, of Salford, in the county of Lancaster, gentleman, for his invention of certain improvements in steam-engines, and also in boilers and in furnaces used for the generation of steam, or other useful purposes.—Sealed 9th November—6 months for inrolment.

To Charles Wye Williams, of Liverpool, in the county of Lancaster, gentleman, for his invention of certain improvements in the means of preparing the vegetable material of peat-moss or bog, so as to render it applicable to several useful purposes, and particularly for fuel.—Sealed 11th November—6 months for inrolment.

To Henry Crosley, of Hooper-square, in the county of Middlesex, civil-engineer, for improved means to be employed in manufacturing beet-root and other vege-

table substances, for the purpose of obtaining saccharine matter therefrom, being a communication from a foreigner residing abroad.—Sealed 11th November—6 months for inrolment.

To Hamer Stansfeld, of Leeds, in the county of York, merchant, for certain machinery of a tappet and lever action, to produce a vertical or horizontal movement through the medium of ropes or bands working over, under, or round pulleys, being a communication from a foreigner residing abroad.—Sealed 14th November—6 months for inrolment.

To William Coles, of Charing-cross, in the county of Middlesex, Esq., for his invention of improvements in gunnery, and in gun and other carriages, and in the means of connecting the same.—Sealed 14th November—4 months for inrolment.

To Robert White, of Nottingham, lace-maker, for his invention of improvements in the manufacture of ornamental lace.—Sealed 14th November—6 months for inrolment.

To Robert Whitfield, of Hercules-buildings, Westminster-road, in the county of Surrey, gentleman, for his invention of a composition which he denominates an indelible safety and durable black fluid writing ink.—Sealed 14th November—6 months for inrolment.

To John Jeremiah Rubery, of Birmingham, in the county of Warwick, umbrella-manufacturer, for certain improvements in the manufacture of part of the furniture of an umbrella, being a communication from a foreigner residing abroad.—Sealed 14th November—6 months for inrolment.

To Joseph Birch Mather, of Nottingham, mechanic and setter-up of hosiery frames, for his invention of

certain improvements in machinery employed in manufacturing hosiery goods, or what is commonly called frame work-knitting.—Sealed 14th November—6 months for inrolment.

To David Shaw and Benjamin Ledger Shaw, of Huddersfield and Holney, in the county of York, manufacturers, for their invention of improvements in preparing woollen and other warps.—Sealed 14th November—6 months for inrolment.

To William Neale Clay, of West Bromwich, in the county of Stafford, manufacturing chemist, and Joseph Denham Smith, of St. Thomas's Hospital, in the borough of Southwark, student in chemistry, for their invention of certain improvements in the manufacture of glass.—Sealed 16th November—6 months for inrolment.

To William Herapath, of the city of Bristol, in the county of Somerset, philosophical chemist, and James Fitchew Cox, of the same place, tanner, for their invention of certain improvement or improvements in the process of tanning.—Sealed 16th November—6 months for inrolment.

To William Fourness, of Leeds, in the county of York, painter, for his invention of a certain improvement or improvements in ventilating pits, shafts, mines, wells, ships'-holds, or other confined places.—Sealed 16th November—6 months for inrolment.

To James Buckingham, of Miners'-hall, Strand, in the county of Middlesex, civil-engineer, for his invention of certain improvements in the means of ventilating mines, ships, and other places, and in apparatus for effecting the same.—Sealed 16th November—6 months for inrolment.

To Thomas Birch, of Manchester, in the county of Lancaster, machine-maker, for his invention of certain improvements in carding engines, to be used for carding cotton and other fibrous substances.—Sealed 18th November—6 months for inrolment.

To Elisha Haydon Collier, of Globe-dock factory, Rotherhithe, formerly of Boston, North America, for his invention of certain improvements in machinery applicable to the raising fluids and other bodies.—Sealed 21st November—6 months for inrolment.

To Christopher Nichols, of Guildford-street, Lambeth, in the county of Surrey, gentleman, for his invention of improvements in embossing or impressing the surfaces of leather and other substances, applicable to various purposes.—Sealed 21st November—6 months for inrolment.

To Elisha Wylde, of Birmingham, in the county of Warwick, engineer, for his invention of certain improvements in locomotive and other engines.—Sealed 21st November—6 months for inrolment.

To James Matley, of the city of Paris, in the kingdom of France, and of Manchester, in the county of Lancaster, gentleman, for his invention of certain improvements in machinery for the operation of tiering, used in printing cotton, linen, and woollen cloths, silks, papers, and other articles and substances, to which block printing is or can be applied.—Sealed 23rd November—6 months for inrolment.

To James Jamieson Cordis, of Idol-lane, in the city of London, merchant, for his invention of an improved mortar, for dressing rough paddy, or redressing rice.—Sealed 25th November—6 months for inrolment.

To Henry Purser Vaile, of Oxford-street, in the

county of Middlesex, civil-engineer, for his invention of improvements in rails for rail-roads.—25th November—6 months for inrolment.

To Richard Tappin Claridge, of Salisbury-street, Strand, in the county of Middlesex, gentleman, for a mastic, cement or composition, applicable to paving and road-making, covering buildings, and the various purposes to which cement, mastic, lead, zinc, or composition are employed, being a communication from a foreigner residing abroad.—Sealed 25th November—6 months for inrolment.

To Samuel Cocker, of Porter-works, Sheffield, in the county of York, manufacturer, for his invention of improvements in making needles.—Sealed 25th November—6 months for inrolment.

To Thomas Moore, of Ison Green, in the county of Nottingham, lace-manufacturer, for his invention of improvements in machinery for framework-knitting.—Sealed 27th November—6 months for inrolment.

To Samuel Draper, of Basford, in the county of Nottingham, lace-maker, for his invention of certain improvements for producing ornamental lace or weavings.—Sealed 27th November—6 months for inrolment.

To John Dover, of Thames-street, merchant, and William Jones, of Bartholomew-close, chemist, both in the city of London, for their invention of improvements in filtering fluids.—Sealed 28th November—6 months for inrolment.

CELESTIAL PHENOMENA, for December, 1837.

D.	H.	M.	
1			Clock after the sun, 10m. 42s.
—			☽ rises 11h. 45m. M.
—			☽ passes mer. 8h. 15m. A.
—			☽ sets 6h. 52m. A.
	1	9	♀ in conj. with the ☽ diff. of dec. 2. 34. N.
	2		☽ in Perigee.
3	18	30	♅ in conj. with the ☽ diff. of dec. 3. 15. N.
4	9	53	☽ in □ or first quarter.
5			Clock after the sun, 9m. 6s.
—			☽ rises 1h. 8m. A.
—			☽ passes mer. 6h. 47m. A.
—			☽ sets morn.
9			Occul. δ in Arietis, im. 4h. 30m.
—			Ceres in oppo. to the ☉ intens. of light 1.146.
	13	5	♃ in □ with the sun.
10			Clock after the sun, 6m. 55s.
—			☽ rises 2h. 25m. A.
—			☽ passes mer. 10h. 52m. A.
—			☽ sets 6h. 14m. M.
12	2	18	Ecliptic oppo. or ○ full moon.
13			Occul. 47 Geminorum, im. 9h. 55m., em. 10h. 33m.
14			Occul. λ in Cancri, im. 18h. 23m., em. 19h. 27m.
15			Mer. R. A. 18h. 21m. dec. 25. 32. S.
—			Ven. R. A. 20h. 54m. dec. 19. 42. S.
—			Mars R. A. 18h. 42m. dec. 24. 6. S.
—			Vesta R. A. 23h. 15m. dec. 12. 3. S.
—			Juno R. A. 16h. 18m. dec. 11. 42. S.
—			Pallas R. A. 1h. 43m. dec. 24. 49. S.
—			Ceres R. A. 5h. 1m. dec. 22. 16. N.
—			Jupiter R. A. 11h. 18m. dec. 5. 44. N.
15			Saturn R. A. 15h. 27m. dec. 16. 45. S.
—			Georg. R. A. 22h. 28m. dec. 10. 23. S.
—			Mercury passes mer. 0h. 45m.
—			Venus passes mer. 3h. 18m.
—			Mars passes mer. 1h. 6m.
—			Jupiter passes mer. 17h. 40m.
—			Saturn passes mer. 21h. 48m.
—			Clock after the sun, 4m. 33s.
—			☽ rises 6h. 53m. A.
—			☽ passes mer. 2h. 29m. M.
—			☽ sets 11h. 3m. M.
17	15		☽ in Apogee.
18	19	15	♃ in conj. with the ☽ diff. of dec. 1. 39. S.
19	8	14	☿ greatest hel. lat. S.
20			Clock after the sun, 2m. 5s.
—			☽ rises morn.
—			☽ passes mer. 6h. 53m. M.
—			☽ sets 0h. 15m. A.
	4	13	☽ in □ or last quarter.
21	2	33	☿ in conj. with ♂ diff. of dec. 1. 11. S.
	11	53	☉ enters Capricornus, Winter commences.
23	2	24	♀ greatest elong. 47. 15. E.
24	6	27	♄ in conj. with the ☽ diff. of dec. 5. 10. N.
25			Clock before the sun, 0m. 25s.
—			☽ rises 6h. 4m. M.
—			☽ passes mer. 9h. 53m. M.
—			☽ sets 1h. 33m. A.
27	2	33	Ecliptic conj. or ● new moon.
28	0	34	♂ in conj. with the ☽ diff. of dec. 4. 0. N.
	9	10	☿ in conj. with the ☽ diff. of dec. 3. 15. N.
29	8	0	☽ in Perigee.
30	10	57	♀ in conj. with the ☽ diff. of dec. 3. 12. N.
31	2	17	♅ in conj. with the ☽ diff. of dec. 2. 58. N.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR OCTOBER AND NOVEMBER, 1837.

1837.	Thermo.		Barometer.		Rain in inches.	1837.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low.	High.	Low.			Hig.	Low.	High.	Low.	
Oct.						Nov.					
26	54	29	29,95	29,80	,1	10	55	41	29,91	29,85	,05
27	53	47	29,58	29,44		11	54	43	29,89	29,84	,0125
28	51	35	29,60	29,32	,175	12	45	38	30,04	29,89	
29	47	33	29,40	29,38	,325	13	47	29	30,04	29,82	
30	57	34	29,33	29,19	,05	14	47	40	29,53	29,45	,225
31	49	40	29,43	29,31	,125	15	45	30	29,97	29,83	,0875
Nov.						16	39	26	29,93	29,87	
1	57	37	29,02	28,76	,4	17	40	22	29,96	29,88	
2	47	37	29,14	29,04		18	39	21	30,02	29,96	
3	46	29	29,36	29,20	15,	19	53	29	29,94	29,79	
4	47	29	29,91	29,40		20	47	36	29,80	29,65	,1125
5	49	31	30,05	29,95		21	47	29	29,86	29,73	
6	45	28	30,29	30,17		22	55	33	29,86	29,81	,05
7	44	23	30,32	30,29		23	55	50	29,74	29,64	
8	39	20	30,23	30,15		24	49	39	29,88	29,83	,1
9	45	21	30,07	29,95		25	48	22	30,01	29,43	

Aurora Borealis.—The Aurora on the evening of the 12th, from 5 till after 10 o'clock, was remarkably brilliant; the coruscations, thoughfew, were vivid, and of a deeply red colour. Again, on the evening of the 15th, about 7, when it was even more splendid, the coruscations which were white, and also more numerous, vivid, and extensive, and apparently based upon a deep crimson ground.

About 8 on the evening of the 12th a brilliant meteor passed through Ursa Major.

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 2 51 West of Greenwich.

THE

London

JOURNAL AND REPERTORY

OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. LXX.

Recent Patents.

To THOMAS GAUNTLEY, *of the town and county of Nottingham, mechanic, for his invention of certain improvements in machinery for making lace and other fabrics, commonly called warp machinery.* — [Sealed 15th August, 1836.]

THESE improvements in warp machinery employed for making lace and other fabrics, consist in the adaptation to that kind of machinery of a series of thin blades, which are denominated *thread-carriers*, being for the purpose of lapping the threads upon the bearded needles, and thereby superseding the necessity of the guides passing between and over the needles, as in the ordinary modes of working that sort of machinery.

In the accompanying drawings, see Plate IX., figs. 1, and 2, represent, in two positions, a series of these

thin blades set in a lead in the way, in which they would be prepared to be mounted in the machine. Fig. 3, is a section taken transversely through a complete machine, in which these thread-carriers are seen at A, mounted upon a longitudinal bar B; and fig. 4, is an elevation of the back part of the same machine.

In this, and the preceding figure, the *thread-carriers*, and the *new parts* by which *they are worked*, are marked with capital letters; the other, or old parts of the machinery, are shown in outlines only, and are marked by small letters; the several letters of reference indicating the same parts throughout all the figures.

The bearded needles are shown at *a*, set in leads, and mounted in a horizontal series upon the needle bar *b*, as usual; *c*, *c*, *c*, are three series of guides fixed upon their several bars, which carry and conduct the threads from the warp beams *d*, *d*, *d*. The sinkers *e*, mounted in leads, in the ordinary way, are affixed to the sinker bar *f*, the centres of which I prefer to place below the needle bar. The presser bar *g*, is, as usual, above the needles. All these parts are constructed nearly in the same way, and operate in a similar manner to the mechanism of an ordinary warp frame when driven by rotary power, excepting the parts supporting the guides (technically called the machine); which parts are, by me, merely slidden in and out by a cam *i*, acting against a rocking lever *j*, *j*, affixed to a shaft *k*; to this the bent levers *l*, *l*, are attached, which work the guide frame; the up and down vibratory movements of the guides being, by the adaptation of my improvements, dispensed with.

The thread-carriers A, are made to rise and fall, through the agency of arms or levers C, extending forward from a longitudinal bar, called the central rocking

bar D. These arms C, are connected in front of the warp frame, by axle joints E, to the bar B, of the thread-carriers, and turn on stationary fulcrum pivots fixed in the framework, which are inserted into the ends of the central rocking bar D. From the back of this rocking bar, an arm or tail lever F, extends, carrying a truck roller G, which truck roller is acted upon by the periphery of a revolving cam H, H, fixed on the main or back shaft *h*; and hence, by the rotation of this cam H, the levers F, and C, are made to vibrate upon their fulcrum pivots at D, and to raise the thread-carriers A, at the required periods for taking hold of the threads extending from the guides to the needles, and lifting them on to the ends of the needles.

The thread-carriers A, have also a slight vibratory movement in the direction from the ends of the guides *c, c*, toward the needle bar *b*, for the purpose of forcing the threads back over the beards of the needles, which operation used to be performed by the movements of the guides in ordinary warp frames. This vibratory movement of the thread-conductors is effected by the following arrangement of compound levers.

The arms I, extending downward from each end of the bar B, are connected by axle joints to levers K. These levers are in like manner connected to arms L, extending from a longitudinal rocking shaft M, at the back of the frame, the pivots of which shaft move in bearings in the end standards. From this rocking shaft M, near its middle, an arm N, extends upward, which is connected by an axle joint to a lever O, and the reverse end of this lever O, is, in a similar way, connected to a rocking standard P, mounted on a bracket Q, Q, fixed to the framework. In the lever O, a truck roller R, is mounted upon a fixed stud or axle, which roller is acted upon by

the periphery of a rotary cam s, fixed on the main shaft *h*; hence, as this cam s, revolves, such vibratory movements will be given to the bar B, through the compound levers P, O, N, L, K, I, as will cause the thread-carriers A, to perform the required evolutions.

Having now described the construction of my improved machinery, I proceed to show the effect of its operations in connexion with the ordinary parts and movements of a warp frame.

The machine being supposed to be furnished with its complement of threads conducted from the beams *d, d, d, d, d*, through the guides *c, c, c*, to the needles *a*, as is usually done, and all parts being in working order, I will consider the mechanism as standing in the position shown at fig. 3, that is, as it would be technically expressed, "at the end of a course." Now, in putting the machine in action, the bar *f*, will first move, advancing the sinkers *e*, for the purpose of bringing forward the work, that is, the loops which have been formed and passed over the beards of the needles by the preceding operation of the machinery; the sinkers will then descend, and cause their hooked nibs to take hold of the guide threads. The thread-carriers A, will, during the advance of the sinkers, rise, and their longer points enter between the threads extending from the guides to the needles; which position of the parts is represented in the partial sectional figure 5; and when this has taken place, the guides are to be shogged, that is, moved laterally by the ordinary means, for the purpose of drawing the threads aside into oblique positions. The thread-carriers still rising, their shorter points now enter between the threads; but owing to the oblique positions which the threads have assumed since the shogging of the guides, the shorter points of the thread-carriers will

not pass between the same threads as their respective longer points did; consequently, the threads, when lifted by the carriers over the needles, will be found to extend diagonally across the needles.

The sinkers now recede, carrying back the wor previously made, and with it the threads under the needles; and at the same time the thread-carriers rise to their greatest height, lifting the threads over the heads of the needles, as shown in the partial section at fig. 6. The thread-carriers then recede for the purpose of pushing the threads back beyond the beards of the needles; and in order to afford the quantity of thread required for forming the loops, the parts called the *machine*, with the guides *c*, *c*, has been made to approach toward the needles. These last described positions of the parts are shown in the partial section, fig. 7.

The movements of the mechanism, as described in reference to fig. 3, will now cause the thread-carriers A, to descend, and in so doing, they will force the threads under the beards of the needles, and then pass down, perfectly free from the threads, into the position shown in fig. 3. During the time that this last movement of the thread-carriers is proceeding, the sinkers *e*, advance a little distance and then rise, for the purpose of bringing the work forward upon the shafts of the needles; the presser bar *g*, then descends on to the beards of the needles, and the operations of forming the stitches or loops of the fabric goes on in the ordinary way.

This is the end of a course; and the progress of the next course, with the movements of the improved parts of the mechanism, is carried on in the way described above.—[*Inrolled in the Rolls Chapel Office, February*, 1837.]

Specification drawn by Messrs. Newton and Berry.

To James Hudson, *of Gale, near Rochdale, in the county of Lancaster, calico-printer, for his invention of certain machinery or apparatus applicable in block printing on silk, woollen, cotton, and other fabrics, and on paper.*—[Sealed 4th December, 1834.]

This is a contrivance for furnishing a continual and regular supply of colour to the sieve or tear into which the printer has to dip his block, for the purpose of receiving the colour about to be transferred to the fabric in the operation of printing silks, calico, or other fabric; or paper hangings.

The ordinary colouring tear is a sieve having a tight but flexible waterproof diaphragm, which is floated upon the surface of a vessel of water, in order that it may afford an elastic resistance. Upon the upper surface of this diaphragm the colour is spread evenly, and the printer, before giving an impression, presses the face of his block upon it, for the purpose of taking up so much colour upon the face of the block, as shall be sufficient to give the print of the pattern upon the fabric. By repeatedly dipping or pressing the block on the diaphragm the thin coat of colour, of course, soon becomes exhausted; and it is the business of another person to furnish the sieve or tear with a fresh supply of colour from time to time, and to spread the colour evenly over the surface of the diaphragm.

The object of the present invention is to afford a continued and uniform supply of colour to the tear, without the assistance of an attendant; and this is done by a travelling endless web, moved by mechanism, which, by passing progressively from the colour vat over the diaphragm, brings forward a constant and equal supply of colour for the printer to dip his block into.

Plate X., fig. 5, represents the construction of this improved apparatus, shown partly in section: *a*, *a*, is a vessel of iron, supported upon wooden standards *b*, *b*, over the upper surface of which vessel a sheet or diaphragm *c*, *c*, of oiled cloth, or other suitable elastic material, is distended and made fast at its edges, by being bent over a flange, and packed or cemented to render the joints water-tight. A vertical pipe *d*, is intended to conduct water to the interior of the vessel *a*, and by a small elevation of the column, to create such upward pressure as shall give to the diaphragm a slight protuberance.

An endless web *e*, *e*, *e*, passing over the surface of the diaphragm, is distended over three rollers *f*, *g*, *h*, the lower of which *f*, is in contact with the colour roller *i*, in the colour trough *k*. On the axle of the roller *i*, a pulley wheel *l*, is fixed, which allows the roller to be turned by a band from any first mover; or the roller may receive rotary motion by a winch fixed on its axle. On this said axle there is also a toothed wheel taking into another toothed wheel on the axle of the roller *f*; hence the rotation of the colour roller *i*, in the direction of the arrow, will cause the roller *f*, to revolve in an opposite direction, and to carry forward the endless web *e*, *e*, *e*, over the elastic diaphragm, the web taking with it a stratum of colour received from the roller *i*, evenly distributed over its surface, and ready for the printer to dip his block into.

The axles of the rollers *f*, and *g*, turn in stationary bearings, but the axle of *h*, is mounted in sliding nuts, which may be moved by turning the screws *m*, for the purpose of tightening the endless web. The axle of the colour roller *i*, turns in mortices, and may be raised by screws *n*, in order to bring its surface into contact with

the endless web. To prevent too great a quantity of colour being taken up, the endless web passes through a long slit or parallel aperture in a frame *o*, which acts as a scraper or doctor, and is adjustable by a screw *p*, to regulate the quantity of colour carried up. The contents of the vessel *a*, and of the ink trough *k*, may be discharged when required, by a cock in the bottom of each.

The Patentee concludes by saying, that he does not confine himself to the size and proportions of the parts, nor to any particular materials of which they may be made, nor to the precise arrangement of the machinery; but that which he claims as his invention is, "the contrivance of presenting for the purpose set forth, a renewed and uniform layer of colouring material or mordant, by means of an extended web of appropriate fabric moving upon or over an elastic suitable supporting surface, and carrying such self-regulating supply of colouring matter or mordant, by whatever modification of machinery."—[*Inrolled in the Inrolment Office, June*, 1835.]

To ALEXANDER DIXON *and* JAMES DIXON, *of Clackheaton, near Leeds, in the county of York, manufacturing chemists, for their invention of improvements in dyeing, by the application of materials not hitherto so used.*—[Sealed 29th April, 1837.]

THIS invention is comprised in a small compass. The Patentees say, according to the ordinary processes of dyeing browns, greens, olives, Saxon blues, and blacks, a substance called "argal" (crude tartar) is employed as a mordant, as is well understood by dyers, which is an expensive material. Now, the object of this inven-

tion is to employ sulphate of soda as a mordant in the process of dyeing, in place of argal, by which the process of dyeing will be materially improved, both as to the cost and in other particulars.

The sulphate of soda is to be ground and sifted, in order to obtain it in the state of fine powder, similar to the condition in which argal is prepared for the dyer; and the subsequent treatment of sulphate of soda is similar to that pursued in preparing and employing argal as a mordant; and a dyer, acquainted with the ordinary process of using argal will, by substituting sulphate of soda, find the working of this invention easily to be performed; and he will find, that in many respects, the colours will be produced more readily than when argal is used, and hence the time occupied in the dyeing of some colours be shortened.

It should be remarked, that the sulphate of soda obtained from the nitrate of soda, is that which is most generally effective for the various colours above mentioned; but the sulphate of soda obtained from common salt (muriate of soda), though less valuable, as requiring more observation and care of the dyer, may be advantageously employed for a mordant in dyeing heavy colours, particularly browns and greens.

The Patentees add, by way of conclusion, "Having thus explained the nature of our invention, and the manner in which the same is to be performed, what we claim as our invention, is the using of sulphate of soda in the process of dyeing, as above described."—[*Inrolled in the Inrolment Office, October,* 1837.]

To Fletcher Woolley, *of York-street, Commercial-road, in the county of Middlesex, gentleman, for his invention of improvements in the manufacture or preparation of materials to be used as a substitute for bees-wax, parts of which improvements are applicable to other purposes.*—[Sealed 15th November, 1836.]

The various substances employed in the different processes of this invention are comprehended under the following heads, and will be referred to in describing such processes numerically.

First, all kinds of animal and vegetable fats and oils, solid at the medium temperature of the surrounding atmosphere, which is about sixty degrees of Fahrenheit, as tallow and other animal fats, and palm oil, cocoa-nut oil, and other like vegetable oils commonly used for giving light by or in combustion. Second, all kinds of animal and vegetable elains and oils, liquid at the medium temperature of the surrounding atmosphere, as the elaine of tallow, palm oil, cocoa-nut oil, seal, whale, sperm, and other oils used for affording light by combustion. Third, all kinds of naptha, or coal, tar, oil, caoutchouc naptha, or caoutchouc oil, gas oil, vegetable naptha, or vegetable tar naptha, and any other like napthas or oils used as aforesaid, and commonly sold for that purpose. Fourth, pyroligneous naptha or ether, correctly named pyroxylic spirit, sulphuric ether, and all other spirits or ethers of like nature. Fifth, all mixtures of the substances included under head the third, with those substances included under head the fourth, as two parts of coal naptha or caoutchouc naptha, with about six more parts of pyroxylic spirit. Sixth, resinous bodies and resins, as

caoutchouc resin, mastic, copal, shell-lac, and others and combinations of them with each other, as one part resin and four parts shell-lac melted together. Seventh, mixtures of the substances included under the heads third, fourth, and fifth, with the substances included under head the sixth, as thick solutions of copal in spirits, ethers, or napthas, &c., and caoutchouc in napthas formed by processes already known to the public. Eighth, certain solid bodies separated from solid animal and vegetable fats and oils, as stearine, stearic acid, margarine, and margaric acid, adipocere, and others of like nature. Ninth, mixtures of the substances included under head the second, with the substances included under heads third and fifth, or three parts of cocoa-nut elaine to one of naptha, or to two of the substances included under head the fifth.

Firstly, palm oil of commerce is to be put into a shallow vessel made of copper tinned, or iron or other suitable metals, and raised to the temperature at which incipient decomposition begins and vapour flies off, at which temperature it must be kept for upwards of half an hour, and then allowed to cool gradually and undisturbed; by which process the stearine will crystallize more perfectly, and separate better from the elaine. When sufficiently cold and solid, or about the consistence of old honey, it is to be put into bags or wrappers made of strong linen or sacking, or other suitable material, of such a size and in such quantity that each bag or wrapper when filled shall be about two feet long, one foot wide, and one and a half inches thick, and in this state subjected to the pressure of a powerful hydraulic screw, or other suitable press (a ten-inch hydraulic ram has been used).

This pressure is to be increased very slowly and gradually, and the material kept as nearly as possible at the medium temperature of the surrounding atmosphere, as long as any elaine continues to ooze, by which process the greater part of the elaine will be pressed out from the stearine.

The elaine thus obtained is applicable to the purposes of burning in lamps to give light, and of lubricating machinery; and the stearine thus produced may be made into candles or other useful articles, or manufactured into a substance to be used as a substitute for bees-wax, as hereinafter described.

Secondly, any of the substances included under head the first, are to be melted and mixed in the fluid state, with any of the substances included under the heads second, third, ninth, and fifth, in a suitable vessel, and in the proportions of three parts of the former to one of the substances under heads third, second, and ninth, or to thirty or forty parts of the substances included under head the fifth, or in any other suitable proportions determined by the dissolving strengths of the substances included under heads second, third, fifth, and ninth; and the solidity and less solubility of the substances included under head the first, for they must be mixed in such proportions that the mixture shall be nearly of the consistence of old honey, at the medium temperature of the atmosphere.

When thus mixed, the mixture must be allowed to cool gradually and undisturbed, to favour the more perfect crystallization of the stearine, and to facilitate the separation of the elaine; and when cold, and of the consistence of old honey or thereabouts, it must be put into bags or wrappers and subjected to pressure, as

hereinbefore described; by which process the elaine will be pressed out combined with its solvent, and the stearine will remain in bags or wrappers.

The stearine can be made into candles or other useful articles, or manufactured into a substance to be used as a substitute for bees-wax, as hereinafter described; and the elaine combined with its solvents may be applied to the purposes of burning in lamps for giving light, and of lubricating machinery.

Thirdly, any of the substances included under head the eighth, of which those made from tallow are best, are to be melted and mixed in the fluid state with any of the substances included under heads sixth and seventh, also melted and in a fluid state, in the proportions of three parts of the former to one of the latter, or in any other suitable proportions, accordingly as the resulting compound to be used as a substitute for bees-wax is required more or less tenacious. For the smaller, the proportion of any of the substances included under head the eighth, the stronger or more tenacious is the compound of the substances included under head the sixth; resin melted with four times its weight of shell-lac is best adapted.

It will also be well to state here, that shell-lac will not melt and mix with the substances included under head the eighth, unless previously united with the resin, mastic, or such like resins; and also that caoutchouc, copal, &c., will not unite well with the substances included under head the eighth, unless previously dissolved, as mentioned and contained under head the seventh.

Fourthly, any of the substances included under the heads third, fourth, and fifth, are to be mixed with any of the substances included under the heads second and

ninth, in proportions varying according to the dissolving strengths of the former, or soluble qualities of the latter, for the purpose of rendering the latter more liquid and better adapted for burning in oil lamps of common construction for the purpose of affording light.

Fifthly, any of the substances included under head the fourth, are to be mixed with any of the substances included under head the third, particularly coal, tar, naptha, and caoutchouc naptha, in the proportions of one part of the latter to three of the former, for the purposes hereinbefore mentioned, and for burning in common oil lamps to give light.

The Patentee says in conclusion, "I claim as my invention the raising of palm oil to the temperature at which incipient decomposition begins and vapour flies off, and the keeping it at that temperature a short time, for the purpose of facilitating the separation of the stearine from the elaine thereof. The mixing of any of the substances included under head the first, for the purpose of facilitating the separation of the stearine from the elaine; and also the mixing of those included under heads third and fifth, with those included under heads second and ninth, for the purpose of rendering them more liquid and better adapted for burning in oil lamps of common construction to give light. The mixing of any of the substances included under heads sixth and seventh with any of the substances included under head the eighth, for the purpose of making substances or materials to be used as a substitute for bees-wax, and also the mixing of any of the substances included under head the third with any of the substances included under head the fourth, for the purposes mentioned; but I do not claim the pressing of any of the materials separately, but only in combination with

the solvents hereinbefore described, for separating the products above mentioned, such pressing having been before employed to some of the matters separately."—[*Inrolled in the Inrolment Office, May*, 1837.]

To JOHN FREDERICK WILLIAM HEMPEL, *of Oranienburg, in the kingdom of Prussia, but now of Clapham, in the county of Surrey, officer of engineers, and* HENRY BLUNDELL, *of Hull, in the county of York, paint and colour manufacturer, for an improved method of operating upon certain vegetable and animal substances, in the process of manufacturing candles therefrom.*—[Sealed 13th September, 1836.]

THIS invention consists in operating upon palm oil, animal fat or tallow and bees wax, in the manner and with the materials hereinafter set forth and explained, so as effectually to separate the stearine from the elaine contained in the palm oil and animal fat or tallow, and convert the said stearine, by submitting it to the process of oxygenation, bleaching, and purifying, hereinafter described, into a highly improved stearic acid, which used by itself makes a very superior candle, or mixed with bees-wax enables candles principally made of that material to be run in moulds, instead of being dipped and rolled in the ordinary tedious manner.

As to palm oil, the Patentees say they subject this material to seven different processes—crystallization, pressing, oxydation or conversion of the stearine into stearic acid, separating the stearic acid from the lime, washing and pressing a second time, bleaching and refining.

First, crystallization; palm oil, as imported, is melted and run into large iron or other vessels, which are called crystallizing vessels; in these it is allowed to cool very gradually, the stearine crystallizes at a temperature of about seventy-five degrees of Fahrenheit, and the elaine at this temperature partly separates from it.

Second, pressing; at about the last-named temperature, it is subjected to a powerful hydraulic or other mechanical pressure; the liquid part which runs from the press is the elaine, and the solid substance which remains in the press is the stearine in an impure state, with a portion of margarine.

Third, oxydation or conversion of the stearine and margarine into stearic and margaric acid. The stearine and margarine are first melted in an iron vessel; to every 104 lbs. of the stearine and margarine, add very gradually 12 lbs. more or less, according to the quality of the ingredients, of very dry hydrate of lime in a very fine powder, keeping the mass briskly stirred during the whole time. The temperature is to be gradually increased to about 240 degrees of heat, and kept well stirred for about three hours, or until a perfect combination of the stearine and margarine with the lime takes place. This may be known by the mass becoming thin and transparent, and when cold, assuming a glassy appearance. This operation being finished, the fire is withdrawn, and cold water added very gradually at first, stirring very briskly all the while, until the whole mass falls into a state of coarse granulation or powder; this is then passed through a wire sieve, to break down any lumps that may remain.

The Patentees observe, that it may be as well to state how they prepare the said hydrate of lime, although

this forms no part of the invention claimed. The limestone must be of the best quality, and free from flints: take pieces of such lime well burnt and fresh, lay them on a sieve, and immerse the whole in water for the space of one minute; take it out, and let the water that is not absorbed run off, the lime will soon fall to a powder; take this and put it into an iron vessel moderately heated, and covered down with a wooden cover, to drive away by evaporation any water that is free. It must then be passed through a fine sieve, and used as quickly as possible, as it soon attracts fresh moisture.

Fourth, separate the stearic and margaric acid from the lime. The stearine and margarine, by the last described process, has now become acidified or oxygenated in combination with lime, forming stearate and margarate of lime. Now proceed to separate the stearic and margaric acid from the lime. For this purpose muriate of lime is used and sulphuric acid. Take as much of the muriate of lime as will produce sufficient muriatic acid of lime to decompose the quantity of stearate and margarate operated upon. To the muriate of lime, add as much sulphuric acid as will precipitate the lime and set the muriatic acid free. Put to the stearate of lime a sufficient quantity of this muriatic acid to dissolve all the lime contained in it, taking care to employ an excess of acid the; proportion will be about 3 lbs. of muriatic acid diluted with 9 lbs. of water to 1 lb. of lime.

This mixture is to lay three or four days, in order to ensure the complete solution of the lime; sufficient heat is afterwards employed to melt the stearic acid and margaric acids which then float on the surface. The muriate of lime is removed into another vessel, and de-

composed with sulphuric acid; the disengaged muriatic acid is used in the next operation with stearate of lime, and so on. By this process the only expense of acid is the sulphuric, which is a saving of at least 50 per cent., and with an almost perfect separation of the lime from the stearic acid.

Fifth, washing and pressing a second time. The stearic and margaric acids having been well washed with hot water, again subjected to the press at a temperature of about seventy-five degrees of heat, to separate the stearic from the margaric acids.

Sixth, bleaching process. The stearic acid is taken from the press, and put upon water in large shallow vessels, placed in the open air, and kept at the melting point from eight to twelve hours, occasionally stirred, and exposed as much as possible to the action of the atmosphere, until it has become white. The margaric acid is bleached in the same manner, as above described, in separate vessels.

Seventh, refining process. It is then warmed again and removed in a melting state to a vessel which is called an agitating tub. To every 1000 lbs. of stearic acid we use in this refining process 1 lb. of the black oxide of manganese, prepared from the white carbonate of manganese, or about 2¼ lbs. more or less of the common black oxide of manganese, 40 lbs. of concentrated sulphuric acid, diluted with 200 lbs. of pure water; this solution, while warm from the heat which it evolves, is placed in a suitable vessel above the agitating tub; the stearic acid, being at the melting point in the vessel below the agitator or stirring shaft of this last named vessel, is set to work, and the solution is allowed to run gradually into it, until the whole is well mixed, which generally requires about two

hours. The mass is allowed to lay in this state for forty-eight hours; it may then be boiled by steam for two or three hours, when it will be found to be sufficiently refined. The sulphuric acid which is at the bottom is now run off, and the stearic acid which remains in well washed with pure water; it is then put into large conical vessels of stone ware, enclosed in a box or jacket and kept warm by steam heat, and lined with conical bags of suitable strong filtering paper, through which, being warm, it finds its way; and when the stearic acid has been thus filtered, it is run into blocks, when it will be found a beautiful stearic acid, which the Patentees call palm stearic acid, or palm wax. It is then ready to be made into candles in the usual way.

Another mode is also proposed to be employed as a process of refining. To 100 lbs. of stearic acid add 16 lbs. of sulphuric acid, diluted with about 128 lbs. of pure water, or 21 lbs. of sulphate of manganese, and 9 lbs. of common salt. Boil these by steam for ten or twelve hours, or take about 10 per cent. of phosphoric acid, and highly concentrated, or 10 per cent. of oxalic acid, boil in either case ten or twelve hours with steam. By using the phosphoric or oxalic acid, any earthy or metallic matter that might still adhere to the stearic acid, are effectually dissolved with more certainty than can be done by the agitator, unless the stirring shaft is very carefully and vigorously worked. And there is no extra expense of acids, as it is worked over and over again, being occasionally purified by the addition of a small quantity of sulphuric acid, which throws down any earthy or metallic matter the phosphoric or oxalic acid may have collected. The stearic acid, after having been well washed with pure hot

water, is in this case also filtered as above, and run into blocks.

As to animal fat or tallow, the Patentees proceed to describe the processes for the preparation of stearic acid from animal fat or tallow crystallization. The animal fat or tallow is well cleansed from all impurities in the ordinary way; it is then in a melted state put into a round vessel, in which is a stirrer or agitator, and in which it is worked until it has cooled down to about 100 degrees of heat, when it will assume a milky appearance, with a granulated texture; the granulations are the stearine in a state of crystallization.

In this state it is put into the press, and subjected to a powerful pressure; the liquid which runs from the press is the elaine or oil of tallow; the solid substance is the tallow stearine for making candles when operated upon as follows:—

Oxydation or conversion of stearine into stearic acid. This process is exactly the same as is described for palm stearine. Separation of the stearic acid from the lime. This process is also the same as is described for palm stearic acid. Crystallization and pressing a second time; after the stearic acid has been well washed with hot water, it is again crystallized or granulated as before described, and pressed a second time. Refining process; the stearic acid is taken from the press, and refined by the second process described for refining palm stearic acid; after being well washed with pure hot water, it is filtered as described for palm stearic acid, and cast into blocks ready to make into candles. Thus has the substance become good stearic acid, which the Patentee calls tallow stearic acid.

Another mode of carrying on the process with animal fat or tallow is as follows:—Having crystallized and

pressed as before, the stearine obtained is to be saponified by combining it with the caustic leys of soda, potash, or any other alkali; thus making stearate of soda or potash, &c. This stearate of alkali is dissolved in a vessel with hot water and steam; to this must be added as much phosphoric acid as will neutralize the alkali and set the stearic acid free. The stearic acid is put into an evaporating vessel with a heat 180 degrees, and is left until the whole of the water is evaporated; it is again pressed, and, after having been well washed and filtered, is cast into blocks, and ready to make into candles. The phosphate of alkali is decomposed with quick lime, forming phosphate of lime and caustic alkali; the caustic alkali is again employed to oxydize a fresh portion of stearine; the phosphate of lime is decomposed by sulphuric acid, and the phosphoric acid is ready to be again employed by this method; the only loss is the sulphuric acid and lime, being about 3 per cent. of the alkali and phosphoric acid.

As to common tallow, mix therewith margaric acid from palm oil, prepared and bleached as aforesaid, in the proportion of 10 to 20 lbs. of margaric acid to 100 lbs. of tallow in the manufacture of common mould or dip candles.

As to bees wax; we will lastly describe our method of operating upon this article, which is simply mixing with it a portion of our palm or tallow stearic acid in its highly improved state, in the proportions of from 5 to 10 parts of stearic acid to 100 parts of wax, and then proceeding to make candles of the materials so mixed, by running them into moulds in the ordinary manner of making other mould candles.

The Patentees conclude by saying, " Now, whereas we claim as the said invention the operating upon palm

oil, animal fat, or tallow and bees wax, by mixing them with the ingredients, and by submitting them to the various chemical processes hereinbefore described, and in manner hereinbefore described, for the purpose of manufacturing candles.—[*Inrolled in the Inrolment Office, March*, 1837.]

To JOHN CHANTER, *of Earl-street, in the city of London, and of Upper Stamford-street, in the county of Surrey, Esq., and* JOHN GRAY, *of Liverpool, in the county of Lancaster, engineer, for their invention of a new combination of parts forming an improved furnace for consuming smoke and economising fuel; applicable to locomotive-carriages, steam-boats, and other useful purposes.* —[Sealed 2d November, 1835.]

THIS invention is described as consisting of a new combination of parts forming an improved furnace, for consuming smoke, and economising fuel, which is considered by the Patentees to be particularly applicable to locomotive-carriages and steam-boats.

In this combination of parts, an additional fire-grate, that is, two fire-grates are adapted, by which means additional water vessels are exposed to the action of the fire, and an increase of steam obtained, as the Patentees say, without a corresponding increase of fuel. This arrangement is said, also, to enable them to use, under particular circumstances, a cheaper description of fuel than that at present adopted, as by this improved construction of the furnace, the smoke and other vapours arising from uncarbonized fuel is subjected to ignition, and reduced to a state of perfect combustion, or nearly so.

The proposed form and construction of the furnace is shown in different sectional views in Plate X., Fig. 1, is a sectional elevation of the furnace or fire-box as applied to a locomotive-engine, taken longitudinally at the horizontal dotted line A, A, in fig. 4; fig. 2, is a transverse section taken at the vertical line B, B, fig. 1, and looking to the end of the fire-box, opposite the fire-doors H, I; fig. 3, is a transverse section taken at the vertical line C, C, in fig. 1, looking toward the direction of the fire-doors. Fig. 4, shows in part a plan of the water chamber taken through the furnaces in the line D, D, fig. 1.

Fig. 1, represents the furnace or fire-box, constructed by external and internal metallic cases in the mode usually adopted; C, C, being the water spaces between the inner and the outer cases.

The interior of the furnace, or fire-box, is divided into two compartments E, F, by a curved water vessel or chamber passing through the furnace, and formed partly of tubular channels *e*, *e*, which may be called hollow bars, and partly by a continuation of the same in the form of a broad chamber *d*, *d*, the whole constituting a water way, or communication from the water space at *o*, to the water space at *p*.

The hollow bars *e*, are of any convenient number, and may be made of greater width than depth, where they emerge from the broad water chamber *d*, *d*, and increase in depth, until they join into the water spaces at *o*. The Patentees prefer them thus constructed for the purpose of equalizing the action of the fire, and maintaining an equal area throughout their length, and giving facility for driving the bolts or rivets through the side flanges, which fix the bars to the casing of the fire-box, as shown at *f*, *f*, in fig. 4. This peculiar form is,

however, not essential to the actual, and, in some degree, beneficial working of the furnace, but it is the one preferred.

The water chambers and bars are connected in the way described, in order that they may operate as stays or supports to the casings of the fire-box, and to facilitate repairs, as the rivets and the water chamber and bars may be easily removed and replaced whenever it becomes necessary, without disturbing the casings of the fire-box.

The water chamber extends to within a short space to the two opposite sides of the inner casing of the fire-box, as shown at *g*, *g*, in fig. 4, which method of construction is adopted for the purpose of simplifying the manufacture. The passage of smoke or gas from the lower fire or uncarbonized fuel, between the sides of the water chamber and the sides of the fire-box, is prevented by fixing a plate of iron on and to the water chamber *a*, *a*, extending as far as the division or determination of that chamber into tubes or hollow bars, fitting closely to the sides of the fire-box, and covering the space between those sides and the sides of the water chamber, as shown by the dotted lines *u*, *u*, in fig. 3.

In fig. 1, *k*, *k*, is a solid metallic dead plate, having a descending flange from its sides, which is rivetted to the inner casing of the fire-box, sufficiently close to prevent any escape or passage of smoke or gas between the joinings; and having a bracket plate *n*, on which one end of the grate bars *e*, rest, their other ends resting on a horizontal bar of iron, extending from side to side of the furnace, a transverse section of which bar is shown at *i*. A dead plate *n*, is rivetted to the bearing *i*, resting at its upper side against the flange *f*. This

dead plate is so placed for the purpose of reducing or preventing the intense heat of the fire at the muzzle of the hollow bars *e*, which might otherwise partially prevent the flow of water through those bars: it is also intended for the purpose of forming a terminus to the fire on the grate bars *l*, and it can be easily removed when necessary; *h*, is an earthenware tile, or fire lump or lumps, extending from side to side of the fire-box, and placed under the water chamber *d*, *d*. This acts in the process of roasting or coking and extracting the gases from the fuel beneath, by reverberating upon the fuel or upon the dead plate *k*, the heat which it receives by means of its position in the furnace, and it tends in some degree to the uniform operation of the furnace; Q, is a chimney furnished with a damper which is to be opened for the purpose of increasing the draft of air through the furnace when found requisite, and for discharging the excess of heat, when the steam from the boiler is shut off from the cylinders, the damper must be kept closed at other times. This chimney is only useful in cases where the natural current or draft of air is but small, as in locomotive engines, and under most other circumstances it may be dispensed with; H, I, are the fire doors; L, L, is the frame or ring for uniting the inner to the outer casing of the furnace or fire-box; and *s*, *s*, are the tubes or flues passing from the furnace to the cylindrical or other boiler T, of the engine.

By the management above described, the gaseous products of the fuel on the dead plate *k*, are nearly all compelled to pass over the fire on the grate bars *l*, where they will, in a great measure, become inflamed; and in cases where a small degree of smoke is not of importance, and the greatest degree of heat and consequent

power is not required, a fire on the hollow-grate bars *e*, may be dispensed with.

It is not essential that the part *e*, *e*, of the water chamber *d*, *d*, should be divided into bars of the particular form above described, and which we have specified as one mode of carrying our invention into effect; but various plans may be adopted—for instance, a beneficial effect would be produced if the water chamber was perforated at *e*, *e*, with holes for the passage of the gases, and air from the lower fire; but we believe its action would not be so perfect as if it were made upon the construction above described. When the furnace constructed, as above described, is put into full action, a fire is to be made in the upper division E, of the furnace or fire-box, on the hollow bars *e*, *e*, with coke, charcoal, or other carbonized or partially burnt fuel introduced through the upper fire door H; and a fire is also to be lighted on the bars *l*, with coal or other uncarbonized and suitable fuel producing smoke and gases, introduced at the lower fire-door I; the further supplies of coke or other carbonized fuel, are to be laid on the water chamber *d*, *d*, and of coal on the dead plate *k*, *k*; the coke and coal will thus respectively become partially and progressively heated and prepared for combustion, as that on the bars is consumed, and will either gradually descend on the fires, or must be propelled or moved forwards by the fireman, and the charges replenished as occasion requires.

As the fuel on the bars become consumed, it is obvious that the coal on the dead plate *k*, will become gradually heated or roasted, and, together with the coal in a state of active combustion on the grate bars *l*, will give out its gases and vapour, which must pass through the openings *t*, *t*, between the hollow bars *e*, *e*,

fig. 4, and the interstices of the ignited fuel on the same, the smoke and gases arising from that part of the fuel which is under the water chamber *d*, *d*, being compelled, by the extended form of that chamber, to traverse a considerable portion of the surface of its own fire, before it can make its escape at the apertures between the hollow bars, where it becomes subjected to the intense heat of the upper fire; by these means the passage of the gases from the coal fire is retarded until the requisite quantity of atmospheric air, passing from the ash pit through the grate bars *l*, (which is indispensable to their combustion) is combined with them.

In passing through the inflamed fuel, the gases become heated to the high degree, which is alike indispensable to their ignition; the hydrogen, and other combustible gases, which constitute a large and valuable part of the weight of coal, and which, in ordinary furnaces, are distilled and wasted through the chimney, are thus rendered productive of heat and flame, and made available as fuel; and as the smoke is also by this means consumed, or considerably reduced, a large proportion of coal, instead of coke, may be used, thereby effecting an important saving in the first cost of fuel, and converting that which was a nuisance to a profitable and useful purpose; and the heat thus obtained, may be applied to the heating of places, fluids, and substances, and many other purposes.

When the combination of parts, above described, is applied to any different constructions of boiler of a locomotive engine than that now usually adopted, or to the boilers of fixed or marine steam-engines, or in other positions, or for other purposes, slight modifications in the arrangements may be requisite to adapt it to its altered situation or form; but it is unnecessary

particularly to enter into detail of such modifications, or of the particular dimensions applicable to various cases, as they will vary according to circumstances; attention to the general remarks, and the description given in the above statement, and to the drawings referred to, being sufficient to lead any person conversant with the manufacture of such apparatus generally, to adopt the dimensions and form to any particular case, and the arrangement and construction of many of the minor parts may be modified according to the size of the apparatus, the situation in which it is placed, and the circumstances governing the same, without at all deviating from our invention, as we define the same.

The various parts may be constructed of such metals or substances as are suited to the nature of the work to be performed, and the degree of strength, power, and durability required; but we prefer a composition of one part of zinc, one part of tin, and twenty-eight parts of copper, for the construction of the hollow water chamber above described.

The claim of invention, as regards this patent, is set out in the following words:—First, the construction and application of the water chamber passing through the furnace, constructed with hollow bars or apertures, forming an upper fire grate, whereon coke or other carbonized, or partially carbonized fuel, may be used, and through which the air and gases from a lower fire must pass, before they can escape or be discharged by the flues of the furnace, and by which means the smoke and gases will be ignited or consumed.

Secondly, the combination of parts hereinbefore described, and by means of which we apply the same. Lastly, we declare that we do not claim originality in the partial distillation of the fuel employed previous to

actual ignition in furnaces, nor in consuming smoke or inflaming gas by passing it over and through fire, various methods having been devised for that purpose; but the peculiarity of our invention consists, as hereinbefore stated, in using for that purpose a water chamber of the construction, or of a similar construction, and in the general improved combination of parts above described; and although we have described many parts of the said improved furnace, and the means of connecting them which are not new, we have done so solely for the purpose of rendering our invention clearly understood, and showing the different combination of the parts, and not as claiming them, and we accordingly disclaim the same, and do not confine ourselves to the particular modes described for that purpose, as other well known plans, too numerous to be detailed, may be adopted as circumstances require.—[*Inrolled in the Inrolment Office, May*, 1836.]

To James Slater, *of Salford, in the county of Lancaster, bleacher, for his invention of certain improvements in, or additions to, certain improved machinery for bleaching linen and cotton goods.*—[Sealed 23d August, 1834.]

The subject of this patent is represented to be an improvement upon an invention of a method of bleaching and finishing linen and other goods, for which a patent was granted to David Bentley, dated 21st February, 1828 (see our Second Series, vol. vii. p. 285). The specification of the present invention describes very fully the manner of carrying on the process of bleaching under the former patent, by passing the goods, in inde-

finite lengths, through the bleaching liquor, and then points out its defects; viz. that no mode was there described of packing or depositing the goods in the keers in which the bleaching process was conducted. The subject, therefore, of the present improvement is a means or mechanism for laying the goods in the keers in regular zigzag folds, and of withdrawing them by machinery also, after the bleaching process has been performed.

The very great length to which the descriptive part of this specification is extended, the multitude of figures representing parts of the apparatus detached, as well as the complete arrangement of all the machinery in the Patentee's mill, at Salford, and the confused manner in which the whole subject is detailed, renders it scarcely possible to comprehend the Patentee's contrivance, after a most careful perusal of the specification, even assisted by our own personal knowledge of these sort of operations, and the usual modes of conducting them. Having, therefore, briefly pointed out the object, we shall endeavour to explain the means in the best way we can.

In the first place, the Patentee conducts the goods or fabrics in continuous lengths, (if we understand right, several lengths together,) by means of guide rollers along the ceiling or roof of the bleaching house; and when brought immediately over the keer or vessel in which they are to be bleached, the goods are to be heaped, that is, deposited in the keer in regular folds, placed zigzag, one fold over the other, as cloth is usually piled in front of a gig-mill. The goods, in an extended form, are passed down a sort of shoot, which is made to vibrate by means of a mangle rack connected to the delivering apparatus, and hence, as the folds of goods descend into the keer, they are laid in long pleats,

covering the bottom of the keer, and piled one fold over another, where they remain to be acted upon by the chemical liquors usually employed for bleaching.

When this process has been completed, and the goods have been thoroughly washed, they are passed between squeezing rollers to express the water, and are then delivered, by a similar sort of machinery, into baskets provided for the purpose; but how this last described machinery acts, we have not been able to comprehend. We are, however, strongly impressed with a notion that the main features of this invention closely resemble the contrivance for hanging up cloths to dry after bleaching, as described in the specification of Southworth's patent of 1823. (See vol. viii. of our First Series, page 298).

The claim of invention set out at the conclusion of the specification, is nearly in these words, "I claim the third portion of the machinery in sheets 4, and 5, of the drawings, for depositing the cloth in the boiling vessel, and for separating the compound continuous bands into single bands." On again referring back to the third division of the description, we find allusions only made to sheet 6, of the drawing, and to numerical figures of reference, pointing out certain parts of the machinery; but neither in such sixth sheet of the drawing, nor in any other of the sheets of drawings, do we find such numerical figures inserted as are referred to; we are, therefore, compelled to leave the subject to be understood by our readers in the imperfect way that we have described it.—[*Inrolled in the Inrolment Office, February,* 1825.]

To Henry William Nunn, *of Newport, in the Isle of Wight, lace-manufacturer, for his invention of improvements in manufacturing the ornamental parts of lace, and producing the ornamented or embroidered lace.*—[Sealed 3d April, 1835.]

The subjects of this invention are embraced under several heads; the first of which is described as the production of an ornamental part of lace; viz. a woven clothwork, or close intervention of threads placed side by side, in strips extending either lengthwise or crosswise of the bobbin-net fabric, or in both directions, in that case forming check-work over the whole or parts of the fabric; which strips of clothwork are produced in the working of the bobbin-net machinery, by interlaying extra weft threads between the two systems of ordinary warp and bobbin threads, in connexion, and simultaneously with the ordinary mode of making the net.

Second, the manufacture of a compound fabric, consisting of alternate rows of clothwork and net, extending across the fabric; this we presume to mean equal strips of each, and consider such a pattern to be embraced by the foregoing.

Third, the employment of means for producing spots or devices, in clothwork, on the bobbin-net, simultaneously with the ordinary operations of the machinery, instead of producing those spots or devices upon the net by hand, with a needle, as heretofore has been practised.

Fourth, the production of ornamental fast purls on the edge of the net, called self-purled bobbin-net, having a Vandyked edge.

Fifth, producing that kind of narrow weaving for ornamenting blond lace, called "*Neige*," connected by warp threads.

Sixth, figuring, by interlaying additional threads, intersecting or crossing in various forms.

By this introductory statement, we should be led to suppose that the Patentee intended to claim the exclusive right of making the articles enumerated, by bobbinnet machinery, of whatever construction and by whatever mechanical arrangement the effects might be produced; and, indeed, if we rightly understand his specification (which is extremely long), he does appear so to express himself, but only explains a manner in which these objects can be effected by that particular class of machinery called the traverse warp machinery.

The mechanical parts applied to the traverse warp machine, for producing the works above described, are, as far as we can perceive, the same kind of appendages which are commonly used for producing various figured or ornamented nets, of which we have given many examples in our preceding volumes. For instance, the Patentee says, that in manufacturing the spotted or figured net described under his third head, he prepares the machine to make a resemblance of Brussels net, having five twists on the sides or pillows of the meshes, and produces the ornaments with two extra guide bars, two guides, and two threads; these, of course, being worked by peculiarly formed cams or tappet wheels suited to the proposed pattern.

It is quite unnecessary for us to give the whole of the details of this long specification, having, as we conceive, no particulars of novelty to describe; the guides must be so situated, and the wheels must, of course, be so formed as to produce the required pattern, a matter which any competent lace-maker will understand, as regards the traverse warp machine; but as to any of

the other constructions of lace machinery, we doubt whether the mode of working set out in the specification, will be found sufficient for the purpose of producing the described articles.—[*Inrolled in the Inrolment Office, October,* 1835.]

To HENRY WILLIAM NUNN, *of Newport, in the Isle of Wight, lace-manufacturer, for his invention of certain improvements in manufacturing or producing certain kinds of embroidered lace, parts of which improvements are applicable to other purposes.*—[Sealed 21st April, 1836.]

THE subjects of this patent are described as improvements on the foregoing, and consist of the following particulars:—First, producing, by bobbin-net machinery, the ornamental edges in imitation of the purled head or edge of Valenciennes lace, which is effected by retarding the delivery of the ornamenting thread at intervals, and thereby constructing the heads or edges; also producing spots or ornaments on the body of the groundwork, in imitation of Valenciennes lace, by means of one guide and one spotting bar in place of two, as employed under the previous patent.

Second, in producing the blond edging uncombined with lace net, having two or more purls, connected together by means of plain threads, thereby forming a fabric of blond lace of any width constructed of purl alone, connected by threads.

Third, in producing "*Neige*" with escollops, and also lace net, having escolloped edges, in bobbin-net machines.

Examples of the several kinds of lace proposed to be made as the subjects of this patent, are appended to the specification, but of which no very intelligible description can be given beyond that which is stated above.

As regards the machinery exhibited, it is merely some detached portions of a traverse warp machine; and the principal feature of peculiarity seems to be a contrivance for contracting, in certain places, the sides of the strips of work called tapeing, or of the loops of the purl-edged escollops, for the purpose of producing particular patterns, called Valenciennes. The ornamenting thread is furnished from a bobbin above, the rotation of which is occasionally retarded by a weighted cord, thereby preventing the delivery of the thread, and consequently, contracting the extent to which the thread shall be carried, either for producing the variable breadths of the tapeing stripe, the shapes of the spots to be worked upon the net, or for the lengths of the loops of the escolloped purl edges.

As these productions are intended to imitate Valenciennes lace, it is proposed that they should be made of brown cotton, and only half bleached when dressed.—[*Inrolled in the Inrolment Office, October*, 1836.]

To Stephen Hawkins, *of Milton House, near Portsmouth, in the county of Hants, gentleman, for his invention of certain improvements in warming-pans or apparatus for warming beds and other purposes.*—[Sealed 24th May, 1834.]

This invention applies to a particular description of warming pan, to be heated by means of hot water, the

proposed object being a more safe and convenient mode of using and filling the pans with hot water.

The Patentee divides his invention into two parts, viz. an improved construction of warming-pan, and improvements in the manner of filling the same.

The first part of the invention will be better understood by reference to Plate IX., fig. 8, which represents the construction of warming-pan described by the Patentee: *a*, is the pan, made of copper or any other suitable metal; *b*, the handle, of wood, screwed into a stem at the back part of the pan, or affixed to it in any other convenient manner. An opening is made in the back of the pan, for the purpose of admitting the hot water, which is to be closed by a screw *c*, when the pan has been filled.

The Patentee observes that warming-pans are sometimes filled by pouring water down the handle, or by removing the handle; but this constitutes no part of his invention, the handle in this pan always being fixed and retained in its proper place.

The second part of the invention, viz. the manner of filling the pan, is shown at fig. 9, which represents an improved funnel: *d*, is the pipe of the funnel, which must be inserted in the opening above mentioned; *e*, is a plug, or rather a float, suspended by a rod *f*. When the water is poured through the funnel into the pan, as it rises the float will be raised also, and close the end of the pipe *d*, and thereby prevent overflow.

The Patentee says, in conclusion, "Having now described my invention, and in what manner the same is to be performed, I claim, in the first place, the adaptation of an opening distinct from the handle, by which the pan may be filled; and, in the second place, I claim the improved funnel, with float, for the purpose of filling

the same, which latter improvement may be applied to other useful purposes.—[*Inrolled in the Inrolment Office, November*, 1834.]

To JEAN BAPTISTE MOLLERAT, *of Leicester-square, in the county of Middlesex, manufacturing chemist, for his invention of an improvement or improvements in the manufacture of gas for illumination.*—[Sealed 2d May, 1837.]

THE Patentee states that hydrogen gas and the oxide of carbon, not possessing in themselves sufficient luminous properties, it has been the practice, or at least it has been suggested to pass them over the surface of distilled oil of coal, tar, and other such matters containing bituminous or carbonaceous substances, or to pass them through peculiarly-formed burners in connexion with coal tar, for the purpose of causing them to take up or absorb carbon; but upon the gas cooling, it has been found that a partial separation of the gases have taken place in the gasometer, when obtained by the first process; and that, in the second case, a constant and careful attention to the operation was necessary, in order to keep the chemical matters properly combined.

The present improvement is designed to produce the combination of the hydrogen with the carbon, in such a way, as shall cause them to remain permanently held together in the gaseous form, and capable of being employed for the purposes of illumination.

The hydrogen gas may be obtained from the decomposition of water in any of the known ways, or by any other process, which is not claimed as new. This gas, at a very high temperature, is to be brought in contact

with the volatile products of oil, whether obtained from animal, vegetable, or mineral, and when this contact takes place, an immediate absorption or blending of the gases will result, and their union become permanent.

The Patentee considers that various forms and constructions of apparatus might be employed to effect this object, none of which, however, he claims, but confines his invention to the permanent combination of the above chemical matter, in the way described, for the purpose of producing gas for illumination.

A second feature of invention, is the use of a very cheap and common mineral or earthy matter called bituminous schistus (slate), which is to be subjected to the process of distillation, for the purpose of evaporating an oil which it contains. This oily vapour may be employed for combining with the hydrogen obtained from water, in the way first described, for the production of illuminating gas at a very cheap cost.—[*Inrolled in the Inrolment Office, November,* 1837.]

To Thomas Alcock, *of the parish of Claines, in the county of Worcester, lace-manufacturer, for his invention of certain improvements in machinery already in use for the manufacture of bobbin-net lace.*—[Sealed 15th December, 1831.]

This invention applies to that particular class of machinery for making lace in which the bobbin carriages slide to and fro through the machine, between the warp threads, upon circular combs; and are actuated by the reciprocating rotary motions of fluted rollers working into teeth or indentations at the under parts of the carriage.

The Patentee refers to that modification of the fluted roller machinery which was invented by Messrs. Henson and Jackson, and became the subject of a patent, dated 11th January, 1825, (see our First Series, vol. xii. p. 141,) in which four fluted rollers were made to perform their required reciprocating evolutions by means of an oscillating segment rack, the teeth of which operated upon a pinion fixed at the end of the shaft of each fluted roller.

By Henson and Jackson's construction of machinery, the whole of the four fluted rollers were made to revolve with the same uniform speed which, at those parts of the operations, when the bobbin carriages were divided into four rows, caused the back and front rows of carriages to move out to a greater distance than was desirable. It is, however, necessary that the back and front rows of bobbin carriages should, at certain periods of the operation, be kept away from the other two rows of carriages which are working in the middle of the machine, and that they should then remain at rest for a short space of time. This, the Patentee, in the present instance, effects by moving the front and back rollers, with the centre rows of bobbin carriages, by a distinct segment rack from that which give the reciprocating rotary motion to the two middle rollers and the middle rows of bobbins and carriages.

The two middle fluted rollers of the machine are worked by the ordinary action of the pendent segment rack; but the two outer fluted rollers are worked by an additional segment rack of less extent, the middle part of which is without teeth, so that when this additional segment rack, as it vibrates, has moved to a certain distance, it ceases to act upon the two outer fluted rollers, and they necessarily come to rest, holding the back and

front rows of bobbin carriages stationary, whilst the two middle rollers are driving the two middle rows of bobbin carriages through the warp threads.

The ordinary mode of working the pendent segment rack is by a compound lever, connected to an eccentric or rotary cam: in this instance, a distinct compound lever is attached to each of the pendent segment racks, and these levers are worked by distinct rotary cams, suitably formed to produce the two different movements from one rotary shaft.

A second feature of improvement consists in actuating both segment racks by one compound lever and one rotary cam. In this instance, the auxiliary pendent rack is connected to the ordinary pendent rack by a loose pin or bolt passed through a curved slot in the latter; so that although a certain and uniform action be given by the rotary cam and compound lever to the ordinary rack, which works the middle rows of bobbin carriages, yet at those periods of the movements of the machine, when the back or front row of carriages, or both of them, are required to be brought to rest, the connecting pin slips along the curved slot, allowing the auxiliary rack to remain stationary, or at least to shorten the extent of its action, although the other rack continues in motion as usual.

By these means the outer rows of bobbin carriages are not carried farther out of the combs than is necessary, but are gradually brought to rest at the extremities of the combs, whilst the middle rows of bobbin carriages continue in action. The back and front rows of bobbins, by these means, have short pauses in their operations, remaining in a quiescent state until the other bobbins come in contact with them, and they all return together to perform as usual.

The Patentee, in conclusion, says, he claims the mechanical means whereby, at certain periods of the operation, the two outermost fluted rollers, (or that one which is the active roller,) is or are turned with a slower motion than the inner rollers.—[*Inrolled in the Inrolment Office, June,* 1832.]

To THOMAS WEDLAKE *and* ROBERT WEDLAKE, *both of Hornchurch, in the county of Essex, agricultural instrument-makers, for their having invented certain improvements in ploughs, particularly the shares, applicable to the same and other ploughs.*—[Sealed 19th July, 1832.]

THE subject of this patent is described as an improvement upon a former invention, relating to the construction of ploughs, for which one of the above parties obtained a patent in 1817. The present improvements are, first, a mode of affixing the share on to the sock of the plough, by means of certain bolts moved by a lever; and, secondly, forming shares of wrought iron of different shapes, with steel cutting edges, or with cast iron, the edges of which have been chilled in the mould.

The specification, which is of great length, is accompanied by a drawing, exhibiting a great number of figures of parts of a plough, described by technical names, perhaps well understood in the particular locality where the Patentees reside, but which, in other parts of the country, we believe, would be perfectly unintelligible. The simple features of the invention may, therefore, be readily conceived without a copy of the elaborate specification, as the whole matter seems to

be the means of drawing out the bolt or pin which confines the moveable ploughshare, by means of a small lever, and hence the capability of readily attaching to the plough any other form of share suited to the nature of the soil operated upon, which share may be steeled or hardened on the cutting edge.—[*Inrolled in the Petty Bag Office, September,* 1832.]

To JUAN JOSE SEGUNDO, *of Burton Crescent, in the county of Middlesex, Esquire, for his invention of an apparatus or method applicable to side saddles, for giving security to persons when riding.*—[Sealed 22d April, 1834.]

THE Patentee has been so extremely concise in the description of this invention, that we deem it expedient to lay before our readers a copy of the explanatory part of the specification *verbatim et literatim.*

He informs us that his invention "consists in a stirrup apparatus or machine, for supporting the right foot of the person riding, and in affixing, supporting, and attaching the said stirrup apparatus or machine to or upon the side saddle, or to or on the near side of the horse." This is the whole matter of the specification inrolled by the Patentee, upon which we shall not presume to make any comment, leaving our readers to draw their own conclusions.—[*Inrolled in the Inrolment Office, October,* 1834.]

To William Weekes, *of King Stanley, in the county of Gloucester, clothier, for his invention of certain improvements in the dressing or finishing of woollen or other cloths or fabrics requiring such a process.*—[Sealed 4th April, 1837.]

This invention is intended to supersede, either partially or entirely, the process called roll boiling, that is, subjecting cloths to immersion in water or steam at a high temperature, after they have been rolled tightly on rollers.

By the manner in which this process of "roll boiling," as it is technically called, is carried on at present, the cloth is frequently very considerably injured, owing to the great strain to which it is subjected in rolling, and the high temperature of the boiling process. It is found that owing to the length of time which the cloth is required to remain immersed in the hot water, and the strain arising from tight rolling, which stretches the fibres that the fabric is so much opened, and by this means injured, that it may be said to have become rotten, and may be very easily torn.

The present invention consists in folding the length of cloth over and over a flat surface, such as a board or metal plate, and in that state subjecting it to a considerable pressure for some hours. The manner in which the Patentee carries this invention into effect is described as follows:—

The cloth is to be taken, in its wet state, and folded longitudinally face to face, bringing the two lists together; it is then wound round a flat board of oak, elm, or poplar, or such other wood as will not stain the cloth. This board is to be about three-fourths of an inch thick, and the edges are to be rounded off, so that

they may not cut the cloth. The board must be about three feet long.

When the cloth is wound upon this board, it is to be subjected to a very considerable pressure between hot plates, for ten or twelve hours, when it may be taken out, unfolded, and folded again, care being taken that those parts of the cloth that were at the edges of the board in the first operation shall be in the middle in the second, so that every part may be acted upon. The operation of pressing may be repeated a third time if deemed necessary.

In cases where broad cloth is operated upon, or when the pieces exceed the length of five-and-twenty yards, two boards may be used, and the folding may begin at each end.

The Patentee concludes his specification by observing, that this contrivance is equally applicable to the process of hot-pressing cloth; but in that operation, as at present carried on, the cloth is not rolled, but folded backwards and forwards, with sheets of glazed pasteboards, tin plates, or skins of parchment between the surfaces, and the cloth is pressed in a dry state.—[*Inrolled in the Rolls Chapel Office, June,* 1837.]

To JOHN KIRKHAM, *of Aldenham-terrace, St. Pancras-road, in the county of Middlesex, engineer, for his invention of an improved mode of removing the carbonaceous incrustation from the internal surfaces of retorts employed in the process of distilling coal for generating gas.*—[Sealed 8th June, 1837.]

THIS improved mode of removing the carbonaceous incrustation from the internal surfaces of retorts em-

ployed in the process of distilling coal for generating gas, consists in the employment of a jet or jets of heated atmospheric air or other airs or gases containing oxygen, which jet or jets of air I direct and impel with force into the interior of such retorts as have become incrusted with corbonaceous and other matters from the continued process of distilling coal.

The retort remaining in the same situation mounted in its furnace which it occupied when employed in distilling the coal, is to be rendered thoroughly red hot, and to be kept in that state during the action of the jet or jets of air. An iron pipe, constructed with several union joints, that is screw joints, and leading from a blowing machine, is bent in such contorted forms, as to admit of its exit end being introduced into the mouth of the retort and directed to any part thereof. The blowing machine is then put into operation by means of a steam engine or other power, and a strong blast of air is forced through the pipe, which air in its passage is to be very considerably heated either by one of the bends of the pipe through which the air passes being introduced into another heated retort, or by a sufficient length of the pipe lying along the heated retort under operation.

By these means a strong current of atmospheric or other air in a heated state may be forced through a pipe or pipes, and by the joints of the pipe directed to any part of the interior of the incrusted retort, and the iar being heated in its course by the above-described method, or by any other convenient contrivance, the effect will be that the jet of heated air will so act upon the carbonaceous incrustation, as to cause parts of it rapidly to burn away, and so to loosen the whole mass of the incrusting

matter from the internal surface of the retort, as to enable it to be readily removed therefrom by the assistance of a crow bar and tongs, or other convenient apparatus.

And in order that the manner of carrying my invention into effect may be better understood, I have shown in Plate X., fig. 6, a sectional diagram of a cast iron retort, and one method of obtaining the desired objects of my invention; *a, a,* is the retort set in brick work, and heated in the usual manner; *b, b,* represents the incrustation adhering to the interior of the same; *c, c,* is the hot air pipe, which, in this instance, is cooled, in order to obtain greater extent of heating surface when placed within the retort, and has but one exit apperture at *d,* opposite the greater portion of the incrustation; but in case the incrustation should be thicker at the sides than at the end, I should lengthen the hot air pipe, apply other exit appertures at the sides thereof, for the exit of the jets of hot air against the other parts of the incrustation, as well as at the end of the retort.

Lastly, I desire it to be understood that the subject matter of my invention or discovery, and that which I claim, the exclusive use of, under the above-recited Letters Patent, is the application of heated air forced in a powerful jet or jets into incrusted retorts, for the purpose of removing the carbonaceous matters formed and adhering to the interior of such retorts as have been employed in the distillation of coal for generating gas.—[*Inrolled in the Rolls Chapel Office, December,* 1837.]

To RICHARD MACNAMARA, *of Hunter-street, in the borough of Southwark, gentleman, for his invention of certain improvements in paving, pitching, or covering streets, roads, and other ways, which improvements are applicable to other purposes.*—[Sealed 15th March, 1837.]

THIS appears to be an improvement upon a former patent granted to the same gentleman, for his invention of a mode of paving, pitching, and covering streets, &c., dated the 20th November, 1821 (see vol. iv. of our First Series, page 10). In the former instance it was intended to prevent the paving stones sinking partially into the ground, and thereby leaving hollows in the road, which was proposed to be effected by forming their sides at such oblique angles to their horizontal surfaces, as should enable them, when placed together upon the ground, mutually to support each other; the same is the object of the present invention; but in this instance the sides of the stones are cut in a different form.

Plate X., fig. 7, represents two of the improved stones shown in perspective, their sides being bevelled in one direction along half the length of each of the stones, and in the reverse direction along the other half of the stone. When the two stones are brought together, their sides will mutually support each other; and when many stones are combined in the manner shown at fig. 8, they will constitute a firm and compact pavement, not liable to sink and form holes, as each individual stone partially supports and is supported by those stones which stand next to it.

Where the paving is intended to terminate, half stones are to be employed to fill up or finish the laying,

that is, the bevel is to extend along one side of the stone only, and those stones will form key stones to the others.

The Patentee contemplates the adaptation of such formed stones or pieces of other suitable material, not only to the formation of roads, but also for floors and roofs of buildings, observing that if they be laid in an arched form, they will require little support beneath, as the principal resistance will be laterally against the abutments or outer walls of the building.

The Patentee claims the form of the stones, having two opposite bevels on one side, as exhibited in the figures for the purpose of producing better paving, pitching, or covering of streets, roads, &c.—[*Inrolled in the Inrolment Office, September,* 1837.]

To DAVID ROWLAND, *of Crawford-street, in the parish of St. Marylebone, in the county of Middlesex, mechanic, for his invention of an improvement in the manufacture of sextants, quadrants, circles, and other instruments used in taking observations and surveys.*—[Sealed 20th December, 1833.]

THE improvement in sextants, quadrants, circles, and such descriptions of mathematical instruments which forms the subject of this patent, consist simply in the adaptation of a second index and horizon glass, with a graduated arc, to the common sextant or circle, which enables the observer to measure another angle at the same time that he measures one with the original arc of either of those instruments. By the addition of these

two angles, he obtains the measurement of one, however great it may be.

The Patentee says, " It is well known to those who are familiar with the use of the quadrant and sextant, and we may add also the circle, that there are certain limits to measuring angles by reflection, beyond which the correctness of the measured angle is not entitled to implicit confidence. The quadrant will not measure an angle above ninety degrees in extent; the sextant will not give one greater than one hundred and twenty degrees; and the circle, it is true, may go further in measuring a large angle; but the errors of reflection arising from various causes, increase so fearfully with the obtuseness of the angle, that little or no dependence can be placed on the result obtained with it.

" When this angle, however, becomes divided into two acute angles, the errors of reflection are obviated, and every possible correctness is obtained which can be derived from such means.

" In measuring an angle with any reflecting instrument between two objects, one of them, generally that on the left hand, is always seen by direct vision through the horizon glass, and the reflected image of the other from the index glass, is seen reflected again from the horizon glass, and brought into contact with it.

" In using reflecting instruments, one of two distant objects (the angle between which it is desired to measure) is viewed by direct vision, through the upper transparent part of an horizon glass, the lower part of which is silvered, and the other of the two objects is seen in the silvered part of the horizon glass by reflection from the index mirror. The position of the index mirror being such, that its plane is perpendicular to the plane of the instrument, and is parallel to the surface of the

horizon glass when the index is at zero; and, in taking an observation, the index mirror is turned, until the plane of the index glass is brought into such a position that it will receive the image of the right-hand object; and then the reflected image of that object is transmitted to the mirror of the horizon glass. The index of the instrument being thus moved, until both of the objects are seen by the observer in exact contact or coincidence in the field of the telescope, the division on the graduated arc that the index then points to, corresponds to the magnitude of the angle that the two objects include between them.

The double sextant combines together two sets of the operative parts of sextants, or any other reflecting instruments consisting of any other portion of a circle, so as to form a double or compound reflecting instrument, each operating part of which may have the same range, but will act in opposite directions, that is, it will have, first, all the parts of a complete reflecting instrument of its particular kind; and it will have, besides, an *additional index mirror* (on a centre distinct from the centre of the principal or original instrument) to receive and transmit the image of an object from one side of the line of collimation to an *additional horizon glass*; and the said *additional index mirror* may be either moveable about a central pivot, by means of an additional index provided with a vernier scale, to indicate a variable angle on an additional limb or arc, graduated in the opposite direction to that of the limb of the original instrument.

The additional horizon glass is partly silvered like the other horizon glass, only in an inverse order; and the silvering of the two horizon glasses is so arranged, as to leave a transparent space between the lower line of the mirror of one horizon glass and the upper line of the

mirror of the other horizon glass, by which arrangement a distant object can be seen in the field of the telescope, through both horizon glasses.

The object and effect of thus constructing a reflecting instrument with such additional operative parts, is to enable the observer to divide a large angle into two smaller angles, and measure both, either with or without the aid of an intermediate object between the two objects whose angular distance is sought; that is, first, when there are three objects in sight, and the angular distance of each from the other is sought, the telescope is directed to the immediate object, which, as before stated, will be visible through both horizon glasses.

The angle between that intermediate object and one of the right-hand objects, can be measured in the usual manner. The index being then fixed by its clamp screw, the remaining angle between the intermediate object and the left-hand object may be measured by bringing it into the field of the additional index mirror, and turning the additional index, until the image of the said object coincides exactly with the two other images that have already been brought to coincide in the field of the telescope. The two angles are thus measured, and indicated at once on the limbs of the double instrument, and the sum of the two is equal to the angle contained between the two outer objects.

And, secondly, when the angle between two objects only is sought, and exceeds the range of any ordinary or simple reflecting instrument, say, for instance, one hundred and eighty degrees; and there is no intermediate object visible, whereby the total angle might be found with two observations, by a common instrument. Then this angle will be found, by using

one of the index mirrors, to reflect the image of one of the bodies into the corresponding horizon glass, when the telescope is directed in the line of some convenient imaginary point, situated between the two objects, (say at eighty-five degrees from one, and ninety-five from the other,) and afterwards using the other index mirror to reflect the image of the other object into its horizon glass, so that the reflected images of the two objects shall form an accurate contact in the field of the telescope; and the angles indicated on the graduated arcs respectively being read off, their sum will be the total angle included between the two objects.

Plate IX., fig. 10: A, A, is the limb of the sextant, on which are circular arcs, divided into degrees and quarters of degrees, from zero to one hundred and twenty degrees; B, is the index, moveable about a pivot at the centre of the arc; A, furnished with a vernier scale, divided in the usual way to the angle observed; C, is the index mirror; D, the horizon glass, which is silvered at the lower part, and the upper part is transparent; E, the dark glasses for observing the sun, or other bright object; F, is the telescope, screwed into the eye-piece; G, the stem of which slides in a tube, and can be raised or lowered, to adjust the height of the telescope, by means of a screw; K, is the tangent screw, with the usual apparatus for the slow motion of the index, and a clamp screw, for fixing it at any particular division on the limb; L, L, L, is the framing of the instrument; O, is a handle to hold it by when in use.

The corresponding small letters indicate the corresponding additional parts, the combination of which, with the ordinary sextant, constitutes my improvement applied to sextants. All these additional parts are con-

structed like the parts of an ordinary sextant, and are provided with adjustments similar to those of corresponding parts of an ordinary sextant.

The arc on the limb *a, a,* is divided into degrees, and quarters of degrees, from zero to one hundred and twenty degrees, from right to left (that on the limb A, being graduated from left to right). The index *b,* is a flat bar of brass, turning on a centre pin that projects from the frame *l, l, l,* of the additional parts, which frame is fixed to the ordinary sextant by standards 1, 2, 3.

The end of the index *b,* is furnished with a venier scale, which is divided in the usual manner for reading off the fractions of degrees of an angle. The said end of the index is furnished with a tangent screw *k,* to move the index forward or backward with a slow motion.

Suppose it were required to measure an horizontal angle of one hundred and forty degrees, between two towers, situated on distant heights, when there is no visible object between them.

Hold the instrument by its handle, with the plane of the instrument, as nearly as may be, parallel to a plane passing through the objects whose angle is to be found. Select by the eye some convenient imaginary point in the plane of the two objects, which shall divide the total angle into two of suitable magnitude. Direct the telescope to that imaginary point, then turn the index B, round to the right, until the image of the tower that is on the right of the line of vision is reflected from the index mirror C, into the horizon mirror D, and back thence to the eye. Clamp the index B, fast at that part of the arc. Now, turn the index *b,* from zero to the left, until the tower that is on the left of the line of vision is reflected from the additional index mirror *c,* into the

additional horizon glass *d*; bring the said left-hand tower, by means of the tangent screw *k*, to coincide exactly with the image of the other object in the field of the telescope. Set the index *b*, there; then read off each angle on its respective graduated arc, by the vernier scale of its index. The sum of the two angles is the desired angle of one hundred and forty degrees between the two towers. When the angle sought is vertical instead of horizontal, the only difference in the method of making the observation is, that the instrument must be held with its plane vertical, and the image of the object above the line of vision will be brought down by the index mirror of the limb A, into the field of the telescope, while the other object, that is below the line of vision, will be brought up by the index mirror of the limb *a*, into the field of the telescope. For instance, suppose it required to measure the sun's altitude on shore, with an artificial horizon, when it is within ten degrees of the zenith, or making an angle with the horizon of eighty degrees (an altitude which could not be measured at all with the ordinary sextant; because the total angle then required to be measured, would be one hundred and sixty degrees and out of the limit of the instrument). Direct the telescope to any convenient imaginary point, half way between the sun and its reflected image in the artificial horizon. Bring up the reflected image of the sun from the artificial horizon, by means of the index *b*, to meet the eye in the field of the telescope, and bring down the image of the sun itself to meet its reflected image by means of the other index B. When the two images are in contact in the field of the telescope, the sum of the angles indicated on the two limbs of the double instrument will be the total angle included between the sun and its image in the artificial

horizon; and the half of that angle is the measure of the sun's apparent altitude.

It may be found, in some cases, more convenient to use the instrument with the index of one or other of the limbs, set at a constant angle. For instance, let the index *b*, of the additional sextant be set at ninety degrees; then, to measure an angle of one hundred and forty degrees, between two objects, hold the instrument in a plane parallel to the plane passing through the two objects, as before directed, and move it in that plane, until the reflection of the left hand or lower object is seen through the telescope in the horizon glass *d*.

In constructing a double sextant or quadrant, the additional quadrant will be composed of such operative parts, that, if detached from the other or original quadrant, and furnished with a telescope, it might also be used separately, to observe and measure an angle; and in the double,

The two index glasses must be so adjusted, that when the indexes are at zero, the planes of the index glasses, will be parallel to the planes of their horizon glasses, respectively.

The construction of the circle, exhibited in fig. 2, is that known by the name of the English reflecting circle, or Troughton's reflecting circle: A, A, is the divided limb or circle; B, B, B, the triple index, each end of which is provided with its vernier scale, and the leading index with a tangent screw and apparatus for the slow motion; C, is the index glass; D, the horizon glass; E, F, are the dark glasses of the index and horizon glasses respectively. All these glasses project as usual from the surface of the circle opposed to that surface on which the graduated arc is marked; L, L, L, is the framing of the circle; M, M, is the secondary frame,

which is usually applied to the back of a reflecting circle, and attached thereto by pillars, to support the glasses. The two circles are placed back to back, the small letters in the additional one corresponding to the similar parts in the original, expressed by the large letters.

There are various circumstances in which the correct measurement of extensive arcs is required where the foregoing invention may be turned to account. For astronomical purposes, it may be applied with advantage to measuring the distance between the sun and moon, beyond the greatest extent that is given in the Nautical Almanac. And, while the distance is *small*, the moon's altitude may be measured on one arc, nearly at the same moment of time that the distance is observed on the other, by changing the position of the plane of the instrument, and not losing sight of the moon's limb, while the horizon beneath is reflected up to it. With the artificial horizon, the extent to which the altitude of a body may be observed, is as great as can possibly be attained; and for observing large angular distances between two stars, the instrument is also adapted. The meridian altitude of the sun may also be found by measuring its supplement to the opposite horizon, when that beneath it is concealed by land; and the instrument may also be applied to measuring the effect of refraction in raising the visible horizon.

In geodetical operations, the value of the instrument, in addition to the power of measuring a large angle, consists also in affording the surveyor the means of obtaining the measure of an angle on each side of an intervening object, at the same moment of time, by which a station may alone be fixed. In this operation, as the

silvered parts of the horizon glasses do not approach closely on each side of the plane, passing through the observer's eye, the space left between them enables him to see the intermediate object distinctly, and thus to satisfy himself that he makes an accurate contact of he reflected images with it.—[*Inrolled in the Inrolment Office, February*, 1834.]

List of Patents

Granted by the French Government from the 1st of January to the 1st of July, 1837.

(Continued from p. 122.)

To Louis Nicolas de Mecquenem, of Clisy, for an improved method of drying timber and wood of all sorts.

— François Désiré Buret, of Bordeaux, for an improved method of closing bottles with glass stoppers, without using cork or other substance.

— Felix Bernheim and Labourian, for a new method of manufacturing raised or embossed leather of all dimensions.

— Antoine Trézel, civil engineer, of St. Quentin, for improvements in hydraulic presses.

— Just Heintz, of Paris, for an improved method of cutting out gentlemen's trousers.

— Louis Charles Henri Fonvielle, of Paris, for the manufacturing of the substance called zoophite.

— Louis Henri Sarazin, of Lavillette, for a new kind of pasteboard.

— Besnier Duchaussais, of Paris, for a kneading machine.

— Jacques Edme Piket, of Paris, for a new kind of lock.

— Hirsch, Bertin, and Durrien, of Paris, for an apparatus for pro pelling vessels against the current of rivers, without the agency of steam.

— Alexander Arthur, of Paris, for improvements in pumps.

— Joseph Legres, of Paris, for a new lamp.

To Benjamin Croquefer, of Paris, for a machine for manufacturing stained paper.

— Jordan de Haber, of Paris, for a stove of a new description for drying beet-root, without injury to the saccharine matter it contains.

— Gerard Henry Dartman, of Paris, for a mechanical means of measuring gentlemen's clothes,

— The Count de Mauny, of Riviers, for an improved windmill.

— Plataret and Payne, of Paris, for improvements in the spinning of dyed cotton.

— Pierre Charollais, of Romans, for an improved system of illumination, by means of gas light.

— Jean Joseph Guillaume Crégut, of Paris, for a machine for grinding olives.

— Jacot Jaloustre, of Clermont Ferrand, for improvements in fire-arms.

— Jean Pier Xavier Clerc, of Belfort, for an economical system applicable to the printing of cotton or other fabrics.

— Levasseur, Brothers, of Paris, for a new means of shutting hermetically vases containing liquids.

— Eleasar Degrand, of Paris, for a refrigerating apparatus.

— Moses Poole, of London, for improvements in looms used for making velvets and other fabrics.

— Barker and Roudiffe, of Rouen, for a mill for grinding dye woods.

— Edward Thomas Bainbridge, of London, for improvements in boats propelled by steam or any other motive power.

— The Marquis of Louvois, peer of France, of Paris, for a means of rendering navigable rapid rivers and torrents.

— Charles Deyres, of Bordeaux, for an improved syringe.

— Laugier and Gardon, of Marseille, for improvements in the making of tubes with rolled lead or tin.

— Moses Poole, of London, for improvements in the machines used for manufacturing nails, rivets, and the like.

PATENTS FOR FIVE YEARS.

— Auguste No, of Nancy, represented in Paris by Mr. Perpigna, Advocate of the French and Foreign Office for Patents, Rue de Choiseul, for an improved kind of embroidery.

To Jean Gabriel Rebut, of Caen, represented in Paris by Mr. Perpigna, for a metallic wadding for guns loaded with ramrods.

— Claude Guillet, of Lyon, represented by Mr. Perpigna, for a new kind of parasol.

— Mrs. Eugenie Bailly, of Neuilly, represented by Mr. Perpigna, for improved trusses.

— Louis Constantin, of Paris, for a mechanical planetary system.

— Thomas Hinton Hasluck, of Birmingham, for an improved button.

— Jean Baptiste Ledure, of Vienna, for a steam apparatus used for warming cocoons, and also as a power for winding the silk.

— Matthieu Rambourg, of Gironne, for an economical substitute for steam engines.

— Sorel Thilorier and Perrurot, of Paris, for a new means of heating liquids by circulation.

— Francois Theodoré Casimir Gary, for an improved system of irrigation.

— Eugene Melecot, of Paris, for an improved bathing tub.

— Honoré Dalmas, of Paris, for an improved thrashing machine.

— André Kochlin, of Mulhausen, for an improved weaving loom.

— Groult and Routron, of Roussel, for a new alimentary substance called dictamia.

— Antoine Louis Leclercq, of Paris, for a new distilling apparatus.

— Rowland Hubert, of Paris, for a new application of the muscular force of man.

— Hyppolite Morel, of Paris, for an economical stove.

— Antoine Dusser, of Paris, for an epilatory comestic.

— Felix Henri Levent, of Paris, for a new opiate.

— Joseph Gabriel Blaquiere, for a new kind of rail applicable to railroads.

— Wilson and Ganoel, for a new kind of wheel for spinning, doubling, and winding wool, silk, and other fibrous substances.

— Thibert and Rameaux, of Paris, for the application to anatomy of the substance called carton-pierre.

— Gabriel Blaquiere, of Paris, for a new method of converting the rectilineal motion into a circular one, and applicable to steam-engines.

— Louis Mullier, of Mans, for an apparatus for cutting straw.

To Gauchez, father and son, of Paris, for an improved fire-arm.

— Sebastian Fleury, of Dole, for an economical stove or chimney, calculated to warm two rooms with the same fire.

— Thues and Co., of Gravelle, for a machine for extracting the gluten in the manufacturing of starch.

— Hyppolite Vandelle, of Lyon, for a new burner for lamps.

— Numa Conte, of Perigueux, for certain improvements in the construction of clocks.

— Joseph Francois Trépot, for an excavating machine, applicable to all excavations to be made in rivers.

— Jean Baptiste Lapel, of Rouen, for an improved weaving loom.

— Andre Marie Augustin Bressier, of Paris, for an apparatus for stamping the paper called stamp-paper.

— Dionisius Aguado, of Paris, for a stand to receive the guitar when played upon.

— Herzog and Co., of Aarau, Switzerland, for a process of printing on fabrics made with straw, or the hemp extracted from barks of trees.

— Julien Jacques Dermont, of Paris, for improvements in the concentration of saccharine juices, extracted from beet-root.

— Pierre Foissac, of Paris, for an improved seal or stamp.

— Pierre Frederick Lenfant, of Paris, for an improved damper for regulating the draft of chimneys.

— Guillon Junior, of Vendome, for boots and shoes with wooden soles.

— Thomas Duret, of Lyon, for improvements in printing cotton or other fabrics.

— Jean Baptiste Chauvet, of Bordeaux, for a means of obtaining a permanent motive power in ports and rivers where the tide rises and falls.

— Francois Etienne Violet, of Paris, for an improved kind of soap.

— Alexis Enouf, of Paris, for improvements in metallic pens.

— Emmanuel Pallas, of St. Omer, for a method of extracting sugar from Indian corn.

— Marie Auguste Louis Derivry, of St. Pierre Aigle, for a mathematical instrument for measuring triangles.

— Bel-etre Viel Junior, of Divan, for a means of bleaching phormium tenax.

— Jean Baptiste Maris, of Ille, for an improved oil mill.

To Louis Adolphe Fortin, of Paris, for a new medicine, called by him dragies au baume Capahu.

— Antoine Francois Waldeck, of Paris, for instruments for cutting male or female screws, on or in metal, wood, or stone.

— Alexandre Giubout, of Paris, for improvements in fire-arms.

— Guillaume Kremer, of Uzes, for a new steam-engine applicable to the spinning of silk.

— Jean Claude Adrien Petit, of Paris, for an improved syringe.

— Pierre Marie Joseph Bennat, of Thann, for an apparatus for making infusions with vegetable substances.

— Francois Chretien, of Nersac, for improvements in the making of endless felt for paper machines.

— Henri Victor Aimé Dinocourt, of Paris, for areometers, barometers, and thermometers, with an invariable index.

— Francois Baptiste Durandau, of Perigueux, for improved drying cylinders, to be employed in paper-machines.

— Louis Francois Gautier, of Paris, for an apparatus for preventing coaches from overturning.

— Chenart Brothers, of Paris, for improvements in the making of hats.

— Francois Burlet, of Lyon, for a kind of indigenous coffee.

— Cartier and Lefevre, of Paris, for improvements in hydraulic wheels.

— Claude Edouard, of Avignon, for a machine for cutting paper at the proper lengths as it is manufactured.

— Felix Moreaux, of Paris, for a means of preserving houses from fire.

— Pierre Nolet, of Paris, for a means of fastening straps for gentlemen's trousers.

— Nicolas Guillaume Cartier, of Paris, for improvements in mills for grinding corn.

— Thomas Martin Ménage, of Paris, for an improved lamp.

— John Taylor and Co., of Calais, for improvements in spotted bobbin-net.

— Achille Colas, of Paris, for improved process of engraving copper or steel plates.

— Charles Julien, of Lyon, for improved burners for lamps.

To Nicolas Ernest Rossignol, of Paris, for a new means of packing goods.

— André Francois Gaupillat, of Paris, for a means of stamping at one blow several copper caps used for percussion fire-arms.

— Louis André Dausque Benoit, of Rouen, for a frame for winding yarn into bobbins or caps.

— Francois Vallet, of St. Etienne, for an improved fire-arm.

— Amand de Chavagneux, of Paris, for improved foils for fencing.

— Turia and Sebille, of Paris, for an improved method of preparing metallic plates for impressions.

— De Borague de l'Isledon and Tillon Slade, for a machine to be employed for raising weights from mines and canals.

— Paul Sevaistre, of Elbœuf, for an improved woollen fabric.

— Antoine Cezarme, of Lyon, for improvements in looms used for weaving.

— Jean Louis Caucanas, of Paris, for a portable vase for receiving natural dejections.

— Antoine Gosselin, of Sedan, for a shearing machine.

— Alphonse Le Brethon, of Ifs, for an improved weighing machine.

— Nicholas Francois Lafontaine, of Pessac, for an improved method of drying cod.

— Laurent Henri Labé, of Paris, for improvements in clocks.

— Nicolas Thirion, of Paris, for improved opera glasses.

— Jean Francois Persos, of Strasbourg, for a mechanical process of drying cotton, woollen, and other goods.

— Pierre Nicolas Valerie Joly, for a printing-press.

— Jean Laurent Amiard, of Paris, for an improved horse collar.

— Desoucher Farjard, of Paris, for improvements in the machine or apparatus used for splitting, marking, piling, and weighing fire-wood.

— Pierre Bavic Magnac, of Tours, for a means of destroying bugs and other vermin.

— Edme Augustin Chameroy, of Paris, for improvements in the construction of organs.

— Jean Duvoir, of Meaux, for an improved stove.

— Bernard Louis Wagner, of Paris, for improvements in clocks.

To Chagot Brothers, of Paris, for a new manner of indicating the names of streets.

— Nicolas Perrin, of Paris, for improvements of nail machines.

— Bruno Maurice Valette, of Lunel, for a new weighing machine.

— Jean Claude Robert, for a varnished paper, to be used instead of oil cloth.

— Louis Genty Junior, of Limoges, for an improved fire-arm.

— Theobald Wagner, of Dornach, for a new plough.

— Eugene Nicols, of Neubourg, for a mechanical bedstead.

— Jean Wagner, of Paris, for improvements in clocks.

— Pierre Louis Desiré Boulfrey, of Amiens, for a machine for singeing cotton velvets.

— André Dumerin, of Alguerande, for a plough with a double regulator.

— Ferdinand Feron, of Biconne, for a means of dressing cotton threads on bobbins.

— Charles Marie Valliere, of Paris, for an improved kind of metallic comb.

— Louis Napoleon Valasse Argentan, for an improved fire-arm.

— The Viscount of Travanel, of St. Florent, for an improved windmill.

— Charles Louis Barrois, of Villers Cotterets, for an improved apparatus for teaching calligraphy.

— Thomas Victor Bishop, of Paris, for a means of manufacturing enamelled ornaments, which may be laid on china, glass, &c.

ADDITIONAL SPECIFICATIONS INROLLED BY THE FOLLOWING PATENTEES.

— Robert Winter, represented by Mr. Perpigna, Advocate of the French and Foreign Office for Patents, Rue Choiseul, for improvements in his thrashing machine.

— Lefebre Meuret, of Tournay, represented by Mr. Perpigna, for improvements in his locomotive boiler.

— Thomas Elliot and Co., of Pont Audemer, represented by Mr. Perpigna, on his process for making malleable iron.

List of Patents

Granted in Scotland between 22d November and 22d December, 1837.

To Moses Poole, of Lincoln's Inn, gentleman, in consequence of a communication made to him by a foreigner residing abroad, for improvements in looms for weaving figured and ornamental fabrics.—30th November.

— Samuel Draper, of Basford, Nottinghamshire, lace-maker, for certain improvements for producing ornamental lace or weavings. —30th November.

— Christopher Nickels, of Guilford-street, Lambeth, for improvements in embossing or impressing the surfaces of leather and other substances, applicable to various purposes.—30th November.

— Joseph Lockett, of Manchester, engineer, in consequence of a communication made to him by a foreigner residing abroad, for certain improvements in the art of printing calicoes and other fabrics of cotton, silk, wool, paper, or linen, separately or intermixed.—1st December.

— William Wilkinson, of Lucas-street, London, engineer, for certain improvements in the mechanism or machinery by which steam power is applied to give motion to ships or other floating vessels in or through water.—1th December.

— Henry Blundell, of Hull, in the county of York, in consequence of a communication made to him by a foreigner residing abroad, for an improved method of operating upon certain vegetable and animal substances in the process of manufacturing candles therefrom, and the application of certain products resulting from this method to various useful purposes.—4th December.

— John Hall, of New Radford, Nottinghamshire, lace-manufacturer, for certain improvements in machinery whereby cloth and other woven fabrics of various kinds may be extended or stretched, or dried in an extended state.—7th December.

— John Upton, of Horselydown-lane, in the county of Surrey, engineer, for an improved method or methods of generating steam-power, and applying the same to ploughing, harrowing,

and other agricultural purposes, to which the power of steam is or may be applied.—8th December.

To William Herapath, of Bristol, philosophical chemist, and James Felcher Cox, of the same place, tanner, for a certain improvement or improvements in the process of tanning.—8th December

— Joshua Taylor Beale, of Church-lane, Whitechapel, London, engineer. for certain improvements in, and additions to, his former invention, known by the title of a lamp, applicable to the burning of substances not hitherto usually burned in such vessels or apparatus, and secured to him by Letters Patent, bearing date at Westminster, 4th January, in the 4th year of William the Fourth.—11th December.

— William Fothergill Cooke, of Breed's-place, Hastings, and Charles Wheatstone, of Conduit-street, London, for improvements in giving signals and sounding alarums at distant places, by means of electric currents transmitted through metallic circuits.—12th December.

— James Leonard Clement Thomas, of Covent-garden, in consequence of a communication made to him by a foreigner residing abroad, for an improvement applicable to steam-engines and steam generators, having for its object economy of fuel.—20th December.

— Thomas Joyce, of Camberwell New-road, London, gardener, for an improved apparatus for heating churches, warehouses, ships, factories, hot-houses, carriages, and other places, requiring artificial heat, and improved fuel to be used therewith.—20th December.

New Patents
SEALED IN ENGLAND,
1837.

To James Dowie, of Frederick-street, Edinburgh, boot and shoe-maker, for his invention of certain im-

provements in the construction of boots and shoes, or other coverings for the human foot.—Sealed 2d December—6 months for inrolment.

To William Occleshaw, of Manchester, in the county of Lancaster, leaden pipe manufacturer, for his invention of certain improvements in the machinery or apparatus for manufacturing pipes or tubes, or other similar articles, from lead or other metallic substances. —Sealed 2d December—6 months for inrolment.

To Thomas William Booker, of Merlin, Griffith Works, Glamorganshire, iron master and tin plate manufacturer, for his invention of improvements in preparing iron to be coated with tin or other metals. —Sealed 4th December—6 months for inrolment.

To George Cottam, of Winsley-street, Oxford-street, in the county of Middlesex, engineer, for his invention of improvements in the construction of wheels for railway and other carriages.—Sealed 5th December—6 months for inrolment.

To Moses Poole, of Lincoln's Inn, in the county of Middlesex, gentleman, for improvements in looms for weaving figured and ornamented fabrics, being a communication from a foreigner residing abroad.—Sealed 5th December—6 months for inrolment.

To Moses Poole, of Lincoln's Inn, in the county of Middlesex, gentleman, for improvements in printing, being a communication from a foreigner res ding abroad —Sealed 5th December—6 months for inrolment.

To John Hall, of the town of Nottingham, in the county of Nottingham, lace-manufacturer, for his invention of certain improvements in machinery, whereby cloth or woven fabrics of various kinds may be extended, or stretched and dried in an extended state.—Sealed 5th December—6 months for inrolment.

To Joshua Taylor Beale, of Church-lane, Whitechapel, in the county of Middlesex, engineer, for his invention of certain improvements in, and additions to, his former invention, known by the title of a lamp applicable to the burning of substances not hitherto usually burned in such vessels or apparatus, and secured to him by Letters Patent, dated 4th February, 1834.—Sealed 7th December—6 months for inrolment.

To Samuel Mills, of Darlaston Green, ironand stee works, near Wednesbury, in the county of Stafford, iron master, for his invention of improvements in machinery for rolling metals.—Sealed 9th December—6 months for inrolment.

To Jeremiah Bynner, of Birmingham, in the county of Warwick, lamp-manufacturer, for his invention of improvements in lamps.—Sealed 9th December—6 months for inrolment.

To Benjamin Cook, of Birmingham, in the county of Warwick, brass-founder, for his invention of an improvement in gas burners, commonly called or known by the name of Argand burners.—Sealed 9th December—6 months for inrolment.

To Cornelius Ward, of Great Tichfield-street, Marylebone, in the county of Middlesex, musical instrument maker, for his invention of improvements on the musical instruments designated drums.—Sealed 9th December—6 months for inrolment.

To Thomas Vale, of Allen-street, Lambeth, in the county of Surrey, coach-joiner, for his invention of improvements in hinges.—Sealed 18th December—6 months for inrolment.

To James Hunter, of Leys Mill, Arbroath, in the county of Forfar, mechanic, for his invention of a machine for boring or perforating stones.—Sealed 13th December—6 months for inrolment.

To William Elliott, of Birmingham, in the county of Warwick, button-manufacturer, for his invention of improvements in the manufacture of covered buttons.—Sealed 14th November—6 months for inrolment.

To Thomas Joyce, of Camberwell New-road, in the county of Surrey, gardener, for his invention of improved apparatus for heating churches, warehouses, shops, factories, hot-houses, carriages, and other places requiring artificial heat, and improved fuel to be used therewith.—Sealed 16th December—6 months for inrolment.

To Joshua John Lloyd Margary, of Wellington-road, St. John's Wood, in the county of Middlesex, Esquire, for his invention of a new mode of preserving animal and vegetable substances from decay.—Sealed 19th December—6 months for inrolment.

To John Gray, of Liverpool, in the county of Lancaster, engineer, for his invention of certain improvements in steam engines and apparatus connected therewith, which improvements are particularly applicable to marine engines for propelling boats or vessels, and part or parts of which improvements are also applicable to locomotive and stationary steam engines and other purposes.—Sealed 19th December—6 months for inrolment.

To Edmund Butler Rowley, of Charlton-upon-Wenlock, in the parish of Manchester, and county of Lancaster, surgeon, for his invention of certain improvements applicable to locomotive engines, tenders, and carriages, to be used upon railways, and which improvements are also applicable to other useful purposes.—Sealed 19th December—6 months for inrolment.

To John White, of Manchester, in the county of Lancaster, engineer, for his invention of certain improvements in apparatus usually employed in lathes for

turning metals and other substances.—Sealed 19th December—6 months for inrolment.

To James Berington, of Winckworth-place, St. Leonard's, Shoreditch, gentleman, and Nicholas Richards, of Camomile-street, in the city of London, builder, for their invention of certain improvements in curing or preventing smokey chimneys, which improvements are also applicable to the purposes of ventilation.—Sealed 19th December—6 months for inrolment.

To Christopher Nickels, of Guildford-street, Lambeth, in the county of Surrey, gentleman, and Henry George Collins, of Queen-street, Cheapside, in the city of London, bookbinder, for his invention of improvements in bookbinding, parts of which improvements are applicable to the cutting paper for other purposes.—Sealed 19th December—6 months for inrolment.

To John Robertson, Jun., formerly of Tweedmouth, Berwick, now of Great Charlotte-street, Buckingham-gate, in the county of Middlesex, gentleman, for his inveniion of improvements of architecture, as regards its construction, or in the description or properties of the forms and combinations, and also of the superficial figures which may be employed; the application of these improvements or of the principles or method thereof, being also for supplying forms, figures, or patterns, in various arts or manufactures; also for an improvement or improvements with regard to the surfaces of buildings, whether interior or exterior, for protecting them from decay, and also giving them a more finished appearance.—Sealed 19th December—6 months for inrolment.

To William Henry Pitcher, of the West India Dock House, Billiter-square, in the county of Middlesex, merchant, for his invention of improvements in the construction of docks, and apparatus for repairing ships

and vessels.—Sealed 19th December—6 months for inrolment.

To Neal Clay, of West Bromwich, in the county of Stafford, manufacturing chemist, for his invention of improvements in the manufacture of iron.—Sealed 19th December—6 months for inrolment.

To William Sandford Hall, of Strathearn Cottage, Chelsea, Lieutenant in the Army, for his invention of improvements in paddle-wheels.—Sealed 19th December—6 months for inrolment.

To William Henry James, of Birmingham, in the county of Warwick, civil-engineer, for his invention of certain improvements in telegraphic apparatus, and in the means of communicating intelligence by signals.—Sealed 22d December—6 months for inrolment.

To Charles Button, of Holborn-bars, chemist, and Harrison Grey Dyar, of Mortimer-street, Cavendish-square, gentleman, both in the county of Middlesex, for their invention of improvements in the manufacture of white-lead.—Sealed 23rd December—6 months for inrolment.

To William Brindley, of Birmingham, in the county of Warwick, patent paper-tray manufacturer, for his invention of improvements in the construction of presses.—Sealed 23rd December—6 months for inrolment.

To William Losh, of Benton Hall, in the county of Northumberland, Esq., for his invention of improvements in decomposing muriate of soda (common salt), parts of which improvements are also applicable to the condensing vapours of other processes.—Sealed 23rd December—6 months for inrolment.

To Jehiel Frankling Norton, of Manchester, merchant, for certain improvements on stoves or furnaces,

being a communication from a foreigner residing abroad. —Sealed 23rd December—6 months for inrolment.

To John Elvey, of the city of Canterbury, in the county of Kent, millwright, for his invention of improvements in paddle-wheels.—Sealed 23rd December—6 months for inrolment.

METEOROLOGICAL JOURNAL,

FOR NOVEMBER AND DECEMBER, 1837.

1837.	Thermo.		Barometer		Rain in inches.	1837.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low.	High.	Low.			Hig.	Low.	High.	Low.	
Nov.						Dec.					
26	48	22	30,01	29,43		11	39	32	30,02	29,98	
27	43	30	29,44	29,40	,2125	12	39	26	29,92	29,85	
28	45	36	29,39	29,17		13	43	30	30,08	29,88	,0125
29	39	26	29,65	29,37		14	41	27	30,15	30,13	
30	50	22	29,65	29,58		15	39	28	30,08	29,95	
Dec.						16	45	25	29,84	29,73	
1	46	36	30,01	29,73	,1875	17	51	41	29,73	29,60	,175
2	34	24	30,22	30,13		18	55	43	29,45	29,33	,35
3	40	25	30,24	30,27		19	51	40	29,88	29,72	,075
4	38	19	30,38	30,34		20	56	38	29,57	29,30	,375
5	38	32	30,29	30,20	,0125	21	44	35	30,21	29,75	,075
6	37	33	30,06	29,90		22	51	35	30,02	29,87	
7	37	27	29,75	29,72		23	51	40	29,89	29,78	
8	40	27	29,63	29,61	,225	24	53	39	29,89	29,81	
9	39	29	29,74	29,58		25	55	48	29,86	29,69	
10	39	27	29,97	29,92	,0125						

Remarkably mild on the 17th, and three following days; and 22nd, and three following days.

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

CELESTIAL PHENOMENA, FOR JANUARY, 1838.

D.	H.	M.	
1			Clock before the sun, 3m. 50s.
—			☽ rises 11h. 15m. M.
—			☽ passes mer. 4h. 45m. A.
—			☽ sets 10h. 30m. A.
	14	11	⊙ in Perigee.
2	18	43	☽ in □ or first quarter.
3	4	12	♀ greatest elong. 19. 16. E.
	15	28	♃'s first satt. will im.
	17	4	♃ stationary.
5			Clock before the sun, 5m. 41s.
—			☽ rises 0h. 8m. A.
—			☽ passes mer. 7h. 55m. A.
—			☽ sets 2h. 39m. M.
—			Occul. δ in Arietis, im. 12h. 15m.
6	18	44	♃'s second satt. will im.
7	1	31	Pallas □ ⊙
	7	44	☿ in the ascending node.
8			Occul. C in Tauri, im. 8h. 7m., em. 9h. 21m.
	20	4	♀ in the ascending node.
9			Occul. 47 Geminorum, im. 19h. 11m., em. 19h. 41m.
	18	1	☿ stationary.
10			Occul. c Geminorum, im. 7h. 24m., em. 8h. 23m.
—			Clock before the sun, 7m. 49s.
—			☽ rises 3h. 26m. A.
—			☽ passes mer. morn.
—			☽ sets 8h. 29m. M.
	7	20	Ecliptic oppo. or ○ full moon.
	15	20	♀ in conj. with ♅ diff. of dec. 1. 3. N.
	17	21	♃'s first satt. will im.
11	10	24	♃'s fourth satt. will em.
	21	10	☿ in Perihelion.
12	11	49	♃'s first satt. will im.
14	8		☽ in Apogee.
	13	25	☿ in conj. with ♀ diff. of dec. 3. 21. N.
15	3	20	♃ in conj. with the ☽ diff. of dec. 1. 12. S.
—			Clock before the sun, 9m. 42s.
—			☽ rises 9h. 26m. A.
—			☽ passes mer. 3h. 22m. M.
—			☽ sets 10h. 12m. M.
17			Mer. R. A. 20h. 13m. dec. 17. 1. S.
—			Ven. R. A. 20h. 49m. dec. 6. 15. S.
—			Mars R. A. 20h. 32m. dec. 19. 59. S.
17			Vesta R. A. 23h. 57m. dec. 7. 5. S.
—			Juno R. A. 17h. 1m. dec. 12. 19. S.
—			Pallas R. A. 1h. 59m. dec. 20. 44. S.
—			Ceres R. A. 4h. 37m. dec. 23. 37. N.
—			Jupiter R. A. 11h. 19m. dec. 5. 46. N.
—			Saturn R. A. 15h. 40m. dec. 17. 26. S.
—			Georg. R. A. 22h. 23m. dec. 9. 55. S.
—			Mercury passes mer. 0h. 27m.
—			Venus passes mer. 3h. 3m.
—			Mars passes mer. 0h. 46m.
—			Jupiter passes mer. 15h. 31m.
—			Saturn passes mer. 19h. 51m.
	10	36	♃'s second satt. will im.
18	12	34	☽ in □ or last quarter.
19	2	46	☿ in inf. conj. with the sun.
	13	42	♃'s first satt. will im.
20			Clock before the sun, 11m. 20s.
—			☽ rises 2h. 15m. M.
—			☽ passes mer. 6h. 48m. M.
—			☽ sets 11h. 9m. A.
	20	46	♄ in conj. with the ☽ diff. of dec. 5. 36. N.
22	5	16	☿ greatest hel. lat. N.
24	13	11	♃'s second satt. will im.
	15	1	☿ in conj. with the ☽ diff. of dec. 8. 38. N.
25			Clock before the sun, 12m. 30s.
—			☽ rises 8h. 10m. M.
—			☽ passes mer. 11h. 42m. M.
—			☽ sets 3h. 23m. M.
	13	51	Ecliptic conj. or ● new moon.
	22	53	♂ in conj. with the ☽ diff. of dec. 3. 36. N.
26	14		☽ in Perigee.
	15	36	♃'s first satt. will im.
27	13	28	♅ in conj. with the ☽ diff. of dec. 2. 41. N.
28			♂ greatest hel. lat. S.
	6	7	♀ in conj. with the ☽ diff. of dec. 6. 0. N.
	10	4	♃'s first satt. will im.
	16	2	♀ at greatest brilliancy.
30	14	27	☿ stationary.
31	13	46	♃'s second satt. will im.

J. LEWTHWAITE, Rotherhithe.

THE

London

JOURNAL AND REPERTORY

OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. LXXI.

Recent Patents.

To MILES BERRY, *of Chancery-lane, in the county of Middlesex, civil-engineer and mechanical draftsman, for a certain improvement or improvements in power looms for weaving, being a communication from a foreigner residing abroad.*—[Sealed 5th December, 1835.]

THESE improvements in power looms for weaving, consist in the adaptation of certain parts and appendages to a power loom, for the purpose of enabling such looms to weave bristles, horse-hair, whalebone, reeds, straw, cane, or other materials of limited lengths, as weft or shoot, with warps of silk, cotton, flax, wool, or other fibrous strands or threads for the production of webs for various useful purposes.

Plate XI., fig. 1, is a front elevation of a loom, capable of being worked by rotary power, to which the improved parts are attached. Fig. 2, is a horizontal view

CELESTIAL PHENO

1 ... nd c'
'O ... gh

D. H. M.
1 Clock before the sun,
— ☽ rises 11h. 15m.
— ☽ passes mer. 4h
— ☽ sets 10h. 30
14 11 ☉ in Perigee
2 18 43 ☽ in □ or
3 4 12 ♀ greates
15 28 ♃'s first
17 4 ♃ sta
5 Cloc
— ☽
—
—
—
6
7

...centric ...re also the ex... ..., or treadles H. These ... parts of a power loom, shown in the ... well understood, and therefore require no ...ther explanation.

The new parts or appendages to the loom, are the boxes or receptacles for containing the lengths of bristles, or hairs, or other materials to be brought into the web as weft, or occasional weft or shoot; the forceps or nippers, for drawing such lengths of bristles, &c., from the boxes, and placing them between the sheds of the warp; the arms or levers, and tappets for moving these forceps, and the mechanism for suspending the throw of the shuttle at certain intervals.

In order to illustrate these improvements, I will proceed to explain their application to the weaving of a fabric suited to the making of cravat-stiffeners, or stocks for the neck, having thread warps, with occasional bristles introduced into the fabric with the weft. For this and similar purposes, where the fabric to be produced is required to be only of narrow width, the warps, reed, headles, and other corresponding parts, are of narrow extent, as shown in the drawing.

The boxes containing the bristles are shown at *a*, *a*, attached to the back of the slay; they are about six inches long, three-eighths of an inch wide, and four

dee bearing upon the peripheries of
n t wheels *o*, *o*, fixed upon a small
. of the legs or swords of the

o, are made to revolve
wheel *p*, fixed on the
ps ed upon by a click
and dra of the loom, as
osit them in the of the lathe
s on. e, to drive

The forceps or nippers *b*, *b*, (on by the shown upon an enlarged scale at fig. 6,) ar d de- at the back of the slay, and each slides laterally nd groove of a brass plate connected thereto, as will be perceived by reference to the back view of the slay, fig. 5. The forceps, sliding in their grooves, are projected across, behind the reed, into the bristle boxes at the opposite sides, by the operation of levers or arms *c*, *c*, which are jointed to other levers *d*, *d*, seen in figs. 2, and 3. These levers *d*, each turn upon a fulcrum pin in a bracket arm at *e*. On the end of each lever *d*, there is a small roller or stud which, as the slay vibrates, is carried up and down in the straight groove *f*, of the race-board, and thereby keeps the lever *d*, from moving the forceps, which is the case when the weft thread is projected through the shreds of the warp by the shuttle only; but when the bristles are to be drawn into the shreds of the warp, the moveable piece *g*, turning upon a pin *h*, set in the race-board, is slidden on one side, as shown by dots in fig. 2, closing the straight groove *f*, and opening the curved groove *i*. The stud at the end of the lever *d*, now, by the backward movement of the lathe, passes along the curved groove *i*, and in so doing causes

the lever *d*, to project the forceps through the shreds of the warp behind the reed.

The shifting of the piece *g*, on the race-board is effected by a projecting stud *k*, affixed at the end of a lever *l*, seen in figs. 1, and 3. This stud *k*, is, by a spring, kept against the face of a lateral cam wheel *m*, which has elevations and indentations corresponding to the required movements of the forceps *b*, *b*. One of the cam wheels *m*, is fixed at each side of the machine upon a shaft *j*, for the purpose of producing the action of the forceps from both ends of the lathe. If the two wheels *m*, are so fixed upon their shaft, that the elevations upon the face of both wheels correspond, then both the forceps will be made to advance and pass each other between the shreds of the warp, fetching a bristle at the same time; but if the elevations of the two wheels are set at intervening points, equally distant from each other, then the forceps will advance alternately on each side every other beat of the lathe.

These variations as to the number of bristles to be introduced into the web compared to the ordinary thread, shoot, or filling, is entirely under the control of the workman, and will depend upon the kind of work to be produced; and for the purpose of facilitating these varieties, other cam wheels, as *m**, having different elevations, may be employed, by slightly shifting the position of the stud *k*.

In order that a different portion of the packet of bristles may be presented to the sliding forceps *b*, *b*, every time that they are projected through the shreds of the warp, the boxes *a*, *a*, are moved up and down by means of rods *n*, *n*, attached to the under parts of the boxes, the lower ends of which rods respectively carry

an anti-friction roller, bearing upon the peripheries of excentric cams or heart wheels *o, o*, fixed upon a small shaft mounted at the back of the legs or swords of the lathe, as shown at fig. 5.

These heart wheels or cams *o, o*, are made to revolve through the agency of a ratchet wheel *p*, fixed on the same shaft, which ratchet wheel is acted upon by a click *q*, attached to a cross rail on the frame of the loom, as shown in fig. 4; the vibrating movements of the lathe causing the click, at every stroke of the lathe, to drive the ratchet wheel *p*, one tooth forward, and thus, by the gradual rotary movements of the cams, to raise and depress the rods *n, n*, and hence to give a slow up and down movement to the boxes *a, a*, for the purpose above stated.

The nebs of the forceps close by a spring *r*, see fig. 6, forming the tail of one of the chaps; and they are opened by a tumbling piece *s*, turning on a pin under the tail of the lower chap, as shown in the detached fig. 6, the nebs being guarded by a plate behind. When the forceps are projected across the shuttle race the nebs are open, the tumbling pieces *s*, having been placed erect, as in fig. 6, by striking as the forceps receded against a stud or small finger *t*, fixed at the back of the slay, as shown in fig. 5; but when the open nebs of the forceps have entered the bristle box, another finger *v*, also fixed at the back of the slay, forces the tumbling piece *s*, from under the tail of the forceps, as shown by dots in fig. 6, and thereby allows the nebs to close and hold fast the bristle. The receding of the forceps now causes the bristle held in the chaps to be drawn between the open shreds of the warp; and when the forceps have nearly reached the end of their sliding movement, the tail or extremity of the lower chap strikes against a stud *u*,

which opens the chaps, and allows the bristle to drop out and occupy the place of weft. The slay now being advanced, beats up the weft, and the bristle becomes interwoven or incorporated into the fabric of the web.

In order to suspend the delivery of the bristles when a sufficient length has been woven to form one stiffener or stock, a pair of cam wheels *w*, see figs. 1, 2, and 3, are mounted at the ends of the shaft of the work beam o. The peripheries of these cams *w*, revolve against the upper ends of levers *x*, *x*, mounted on studs fixed in the side frames of the loom. To that one of the levers *x*, shown in fig. 3, an arm *y*, is affixed, the reverse end of which arm is connected to a bell-crank lever *z*, mounted at the side of the frame, as shown in fig. 1. The upper end of this bell-crank lever *z*, is attached to a spring arm a, see fig. 3, which acts upon a clutch rod b, sliding in the hollow axle of the tappet wheel *m*. This clutch rod is connected to a clutch cam c, (fig. 2,) on the same shaft; one portion of which clutch cam is fixed to the shaft, the other portion slides upon it, and thereby forms either a straight or a zigzag groove, for the guidance of a clutch lever d. This clutch lever turns upon a fulcrum pin in a bracket or arm e, extending from the frame, the one end of the lever d, having a stud, which works in the groove of the cam c, the other end having a fork, acting upon a slider or clutch f, upon the tappet shaft e. When the end of the lever *x*, falls into the notch of the cam *w*, the clutch cam c, is drawn into the situation which forms a straight groove for the stud of the lever d, to act in, the loom then produces plain work; but when the cylindrical part of the cam *w*, acts against the lever *x*, then the lever *x*, is forced back, and the clutch cam slidden so as to form a zigzag groove for the stud of the lever d, to work in; the reverse end of this lever is

thereby made to slide the clutch f, on the tappet shaft G, and to move the tappets g, out of action which before worked the pecker levers; hence the action of the shuttle is suspended, and the forceps alone draw the bristles for weft. If, however, the work is to consist of ordinary thread weft from the shuttle, as well as bristles drawn in by the forceps, then this clutch apparatus is altogether dispensed with.

The notch in the cam *w*, allowing the end of the lever to come forward, a horizontal rod h, see fig. 3, is drawn with it, which brings forward a catch i, that locks the lever *l*, and prevents the bolt *k*, being acted upon by the face cam wheel *m*. This part of the apparatus is brought into operation for the production of the plain parts of the fabric.

It will be perceived that these parts of the loom for varying the kind of work may be changed in different ways, and effected by different sorts of mechanism. I, therefore, do not intend to confine myself to their exact position, forms, or dimensions, as those matters must depend upon the kind or quality of work to be produced; but I claim, as my invention, secured to me by the above in part recited Letters Patent, the application to power-looms of the parts and appendages for holding the bristles, wires, hairs, whalebone, reeds, straws, cane, or other materials, and conveying them between the warp threads, or into the web or fabric; and the necessary parts for stopping or changing the operation of the same, and also of the shuttle, for the purpose of weaving different proportions of such materials into the web or fabric, and stopping the introduction of the said materials when sufficient length has been made, and then weaving plain web or fabric. A power loom, when these parts are properly applied and combined there-

with, being capable of weaving such fabric without the necessity of the hands of the attendant or workman being used for introducing the materials into the web or fabric.—[*Inrolled in the Rolls Chapel Office, June,* 1836.]

Specification drawn by Messrs. Newton and Berry.

To JOEL LIVESEY, *of Bury, in the county of Lancaster, cotton-spinner, for his invention of improvements in machinery used for spinning, preparing and doubling cotton and other fibrous substances.*—[Sealed 10th November, 1836.]

THIS invention applies principally to that construction of spinning machine called a throstle, and is designed in the event of any of the yarns breaking between the front drawing rollers and the spindle flyers, to prevent such broken ends of the yarns lapping round the front drawing rollers, by the adaptation of a roller covered with cloth or other rough surface, which is to be kept in contact with the under surface of the front drawing rollers, by means of springs or by a weighted lever, for the purpose of taking up such broken ends of yarn and lapping them round itself.

The Patentee describes his invention as consisting in the application to the front drawing rollers of such spinning machinery, of a moving surface of woollen cloth or any such material, by means of which the lapping or accumulation of roving yarns or threads round the front drawing rollers are avoided when a thread breaks, and which also prevents the very common occurrence of the broken end interfering and entangling with the other threads; and further, it is said this

improvement renders the piecing or joining of the broken yarns more perfect, because it is effected with the exact amount of roving, thread, or yarn delivered from the front drawing rollers, the lapping being taken up by the under clearing surface, where it can remain until the attendant has leisure to remove it; and it is said that this allows the piecing to be performed more expeditiously, and fewer hands are, therefore, required.

Plate XI., fig. 7, represents in section that part of a throstle frame which is called the drawing apparatus; *a, b, c,* are three pairs of drawing rollers, between which the rovings of cotton or other fibrous materials are passed in the usual way from the spools in the creel above, and delivered in the drawer, that is, in an extended or refined state from the front rollers *e*, to the bobbins and flyer below. A roller *d,* called the under clearer, is covered with cloth or some other suitable material, and mounted upon weighted levers *e*. As these levers hang upon fulcrum pivots in the standards *f*, the weights *g*, keep the roller *d*, in contact with the periphery of the lower front delivering rollers *c*, and thereby cause the clearing roller *d*, to turn with them. In the event of the descending yarn breaking between the delivoring rollers and the flyer, the rough surface of the clearing roller *d*, takes hold of the broken end of the yarn, and laps the yarn round itself until released by the attendant.

The manner of applying the under clearer, as shown in the figure, is to be considered only as one mode of adapting it to drawing and spinning machinery, as the Patentee says that he is well aware it may be variously modified by the adoption of springs instead of levers, and even by the employment of a moving surface of woollen or similar substance; but that which he claims

as his invention, is the construction and application of a revolving clearer to the surface of the under front or delivering roller of such machinery.—[*Inrolled in the Inrolment Office, May*, 1837.]

To LUKE HEBERT, *of Paternoster-row, in the city of London, civil-engineer, for his invention of certain improvements in machines or apparatus for, and in the process of, manufacturing bread from grain; and the application of other products, or another product thereof, to certain useful purposes.*—[Sealed 24th January, 1833.]

THE subjects comprehended under this patent, embrace a series of apparatus and machinery to be employed for producing bread from corn, commencing with a process for cleaning foul grain, which is effected by washing and scouring; the grain is then dried in a hot-air apparatus, and afterwards ground and sifted in a peculiar construction of mill. Then follows a machine for kneading the flour into dough for making bread, to which is connected an apparatus for generating carbonic acid gas for the purpose of impregnating the dough with what is commonly called fixed air, instead of working it in the ordinary way by yeast; or, in the event of making sea bread (biscuit), another kind of machinery is employed for kneading the dough, from whence it is rolled out and cut into the forms of biscuits. The next machinery in succession is, a moveable platform for carrying the bread when made forward into the oven, and for withdrawing it when baked. The construction of the oven is also novel, and the method of heating it either by hot air or steam.

The following is the Patentee's description of his invention, with some slight variations in the language, and curtailments of the matter, which, in the original specification, is of very considerable length:—

As much of the grain which is brought to market is found to be in a foul state, from a variety of causes, I prepare the grain for the subsequent operations of making into bread, by cleansing it from impurities, by scouring, washing, and separating in a machine, of which Plate XII., fig. 1, represents a section. Into a barrel or cylinder *a*, of any adequate dimensions, I put, through a door *b*, three parts of grain, together with one part of very coarse sharp sand, or fragments of buhr stone, or flint, duly sifted, so that they shall freely pass through a mesh that will detain the grain; I then fasten the door, and by means of a winch on the axis, or other convenient means, according to circumstances, I cause the barrel to rotate, and by the action of the sharp sand interposed amongst the grain, to scour off the impurities on the surfaces of the latter. When this scouring operation is completed, I bring the door of the barrel to its lowest side, and discharge its contents into a large rectangular flat sieve *c*, which is immersed just under the surface of a large body of water contained in a bath *d*.

The barrel now empty is to be re-charged with grain and coarse sand, as before, and the scouring recommenced; the rotation of the cylinder, by which this operation is effected, it should now be observed, is made to agitate the sieve *c*, through the medium of a pulley *e*, shown in the transverse section fig. 2, on the axis of the barrel, and an endless cord or chain *f, f*, which passes round two guide pulleys *g, g*, and by these it is conducted, in a horizontal direction, around a fourth pulley *h*; which fourth pulley revolves in a

horizontal plane, and carries with it an eccentric plate *i*, on the top of which a pin *k*, fixed to the bottom of the sieve *c*, works; thereby causing the sieve to make a circular motion.

Further, to increase the agitation of the materials, the sieve is made to incline from side to side during its revolution, by being suspended from *four* points, (as the two shown at *l*, *l*,) to *two* projecting arms *m*, *m*, which are fastened to two spindles *n*, *n*, that have their bearings in four side standards, two of which are seen at *o*, *o*.

A violent collision of the particles of corn and coarse sand is thus produced, causing them to be thoroughly separated, the latter to pass through the meshes of the sieve to the bottom of the bath, and the former to be thoroughly washed. The sound grain, from its greater specific gravity than water, remains in the sieve, while the unsound grain, from its inferior specific gravity to the water, rises to the surface of the water in the bath, whence it is floated away by a gentle current, produced by the running of a small stream of water from a pipe *p*, at the end of the bath, and passing over a partition or dam *q*, it falls into a receptacle *r*, underneath, to be carried thence out of the machine by a spout at *s*.

Both the operations of scouring in the cylinder, and of washing and separating in the bath, being completed, it becomes necessary, in order to operate upon fresh portions of grain, to remove that contained in the sieve. For this purpose there are two levers *t*, and *u*, fixed also to the spindles *n*, *n*, and these levers are connected by a rod *v*, which causes them to move parallel to each other; therefore, by pulling the lever *t*, in the direction of the curved arrow, the sieve is lifted out of the water into the position shown by the dotted lines; a flap on the sieve at *w*, being now

let down, the gear may be readily discharged into a contiguous hopper, where it may lie to drain during the operation of the machine upon the succeeding portion of grain.

The Patentee says, I claim as of my invention in this apparatus the general combination described, and the washing and separating apparatus considered distinctly from the scouring barrel.

To dry the grain that has undergone the last-mentioned operation, or other grain that may have contracted dampness, I pass it through a warm air kiln, of which the following is a description:—

Fig. 3, is a longitudinal section of the kiln; at *a*, is a fan wheel, the rotation of which draws in air at its centre, and propels it along a broad flat channel *b*, and a curved continuation of the same *c*, into a horizontal transverse tube *d*; from this tube the air enters six bent tubes, like that represented at *e*, which are placed side by side, and about half an inch apart, so as to form a grate, wherein fuel is burned to heat the air passing through the tubes; the heated air thence enters an upper horizontal transverse tube *d*, and curved branch from the same *f*, which discharges into a long metal air trough *g*, *g*. The bottom of this trough (made of iron or copper) forms the top of the fire flue, consequently abstracts much of the heat from the gaseous matters passing under it.

The trough is provided with no other cover than an endless band *h*, of extremely open-woved canvas cloth, which continually traverses lengthwise over the whole area of the said trough, the edges of the cloth sliding between grooves and over tie-rods at *i*, *i*.

The cloth is made to traverse by the revolution of three drums or rollers *j*, *k*, *l*, and is kept distended by a self-acting tightening roller *m*, which is screwed to a

hopper *n*. This hopper, supposed to contain the grain to be dried, is provided with a shoe *o*, adapted to deliver an even and thin stratum of the grain upon the endless cloth, while the same is passing under it and over the air box, in the direction indicated by the arrows.

Upon this cloth arriving at the drum *k*, it comes in contact with another endless cloth *p*, *p*, which passes around the drums *k*, *l*, only; thus the grain, after passing over the air trough, becomes enclosed between the two endless bands *k*, and *p*, and is thereby carried up the inclined plain to the drum *l*, where the two endless cloths separate, and discharge the grain back again into the hopper *n*, to undergo a repetition of the operation should it be deemed necessary, which, however, will seldom be the case, as there are so many obvious ways of regulating the velocity of the fan and the drums, as will enable the operation to be completed usually by a single passage through the machine. In this latter case, the grain, instead of falling back into the hopper, may be received on to a shoot or creeper to conduct it away.

The improvement in kilns, for which I lay my claim to invention, consists, in causing warm air to pass through endless cloths in motion, wherein the corn to be dried is distributed; which principle or characteristic is susceptible of a variety of modifications.

The grain thus purified and dried, I free from any loose dust it may have acquired, by passing it through a cylindrical sieve, the agitation of which drives the dust through the external covering of wire work, and delivers the grain in a very pure state to the feeding apparatus of the mill to be ground.

The mill I employ for this purpose, instead of consisting, as usual, of a single pair of stones of great diameter, by which the flour that is formed near the centre

is carried round and round the stones before it is extricated; it is formed of two, three, or four pairs of stones of small diameter, placed one above another upon the same spindle, so as to grind the corn by progressive degrees, and to separate the flour as it is produced, in order that the meal, which is sufficiently triturated, may not be further operated upon. On this principle I prefer, for general purposes, three pairs of stones to form one mill.

Underneath each bed-stone is suspended, by wires and hooks to the division plate, a sieve of the conical form, and underneath each sieve is an inclined bottom, which receives the flour, and by agitation discharges it through spouts. A shaking motion is communicated to the sieves by the revolution of the spindle, on which is a pulley that communicates, by an endless cord, rotary motion to another pulley, on a lateral spindle; this spindle has upon it three eccentrics, which work in forked levers connected to the sieves, and thereby produce in the latter, and the bottoms and spouts *p*, *p*, *p*, before mentioned, a vibratory motion.

The mill is fed with grain in the usual manner by a shoe, whence it falls into the eye of the top pair of stones, which are set rather wider apart than usual, being chiefly intended to prepare the grain for subsequent grinding; nevertheless, some flour is thereby formed, which, together with the meal generally, is ejected from the periphery of the stones on to the circumference of the upper sieve, which separates the flour, and delivers it out by its spout, while the unground portion of the meal runs down the inclined sides of the sieve, through the central aperture into the eye of the second pair of stones, which are set rather closer together than the first, and they deliver their product on to

the circumference of the second sieve, which, in like manner to the first, separates the flour, and delivers the remainder of the meal into the eye of the third pair of stones. This third pair are set rather closer still than the former, to clear the bran; the flour being separated by a third sieve, which discharges the bran and offals into a fourth sieve, or any other apparatus, if required, to be brushed.

The waste of flour is prevented by boxing in the whole of the mill, flush with the framing, having, at suitable places, sliding shutters for inspecting the interior. This obviates the necessity of confining the stones within cases, and leaves large spaces for the flour to fall freely through, from the delivering edges of the stones, upon the projecting surface of the sieves underneath. Upon the upper surface of the top stone, four small vanes are fixed in order that they may act as a fan wheel, and accelerate the current of air through the machine. My claims to invention in the mill described, consist in the novel combination of several pairs of small stones, with the sieves and spouts as set forth, and all imitations of the same.

In the application of flour to the manufacture of porous or spongy bread (usually called "light") I substitute, as far as circumstances may render practicable, the employment of yeast, leaven, or other fermentable matter into the dough, by the direct infusion of carbonic acid gas, during the process of mixing and kneading. For this purpose I employ the mechanism delineated in figs. 4 and 5.

Fig. 4, represents a vertical section of the principal parts of the whole apparatus; and fig. 5, a side elevation of the mixing and kneading machine, with a section of the gasing apparatus in front. At *a*, is the

generator, in which is to be put some broken marble or other carbonate of lime, through the aperture of the safety valve *b*, through which is also to be poured some dilute acid, when the valve should be closed. The gas which will now be liberated, will pass through the pipe *c*, on to the apertures at the end of *d*, where it will enter the water contained in the gas holder *e*, introduced at a hole provided with a screw-stopper. That portion of the gas which is not absorbed by the water, will bubble up and occupy the space above it, where a pressure will be exerted according to the volume of gas generated, and to the load on the safety valve. The dough cylinder *f*, being charged with a quantity of flour, it is put in rotation by means of an endless strap passed round an annular pulley *g*, fixed to the cylinder by means of screws and blocking pieces, as shown at *h*, *h*. The axis *i*, of the cylinder, it should be observed, is, during this operation, made stationary by means of a pin passed through it and the plummer block.

The carbonated water described may now (or it might be previously, whichever being immaterial), be let into the cylinder; by turning the cocks *j*, the water rushes up the pipe *k*, which reaches to nearly the bottom of the gas holder, and passing round the bend *l*, through a tee-piece *m*, and union joint *n*, it enters into a longitudinal central aperture *o*, in the axis *i*, whence the water escapes through numerous small perforations *p*, amongst the flour with which it soon becomes intimately mixed. To ascertain when this is the case, a sample may be drawn from a try-hole at the side, provided with a screw stopper not shown in the drawing.

If it is desired to introduce more flour to make the paste stiffer, it may be introduced by the door *g*, where the first portion was put in, which, instead of the screw

bolts represented in the drawing, may be more advantageously closed by a cross-bar and screw, in the usual manner of closing retorts. Should the dough be too dry, more water may be introduced as before explained; or should it require more inflation to render it more vesicular, yet be already sufficiently moist, gas alone may be introduced by turning the cock *r*, which communicates with the gas reservoir, formed as before mentioned above the water in the upper part of the holder *e*, the gas thence passing through the bend *s*, the other limb or tube of the tee-piece before mentioned, &c., enters through the perforation *p*, into the cylinder.

The rotation of the cylinder, which constantly causes the paste to ascend the inclined sides of the vessel, and to tear away from its adhesion to the metal, encloses or wraps up the gas and common air contained in the cylinder, and by the continued action produces a minute intermixture. To ensure the constant falling over of the dough, a scraper *t*, fixed to the axis by arms *u*, *u*, (which also scrape the sides of the cylinder), is placed in such a position as to shave off the dough as it attains to its highest elevation, and cause it to fall down continually.

When the dough is judged to be complete, the door *g*, is to be brought to the underneath position, and the rotation of the cylinder then stopped. The door being now opened, the greater part of the contents of the cylinder will be discharged into an external recipient, placed underneath to receive it, and whatever dough may adhere to the cylinder may now be entirely removed by giving a turn or two to the winch *r*, which being fixed to the axis that carries the scraper, clears off the dough, and causes it to fall through the door-way into the external recipient before mentioned.

Instead of the usual stuffing boxes employed to prevent leakage between the cylinder and the axis, the axis is at these parts turned down conically internally, and cylindrically externally, the coned parts adapting themselves to the wear when brought up by the screws exhibited. The minor arrangements of this apparatus are too obvious to a mechanic from the drawing to need further description.

My claims to invention in this apparatus, are the combined application of carbonic acid gas with a machine for kneading dough, and the peculiar arrangement of the kneading machine.

In preparing dough for sea bread or biscuit, which does not require to be impregnated with gas, a different construction of machinery is employed. Fig. 6, is a longitudinal section of the machine for making biscuits; *a*, is a hopper, within which a vertical shaft *b*, is made to revolve by means of a pulley and band, or any other means. This vertical shaft has a series of oblique knives extending from it; and within the hopper a series of arms are fixed which the knives pass between as the shaft revolves.

Flour is introduced into the hopper by a shoot *c*, which conducts it into a sieve *d*. This sieve receives a continued agitating movement by the rotation of an eccentric *e*, which causes it to sift the flour into the hopper. A pipe *f*, conducts water which is distributed in a gentle shower through a series of small holes in the circular pipe *g*. By the rotation of the oblique knives, the flour and the water are stirred up in the hopper and converted into dough; and as the quantity accumulates, the dough gradually descends to the bent part at the bottom of the hopper and is forced out.

Two series of drums *h*, *h*, *h*, and *i*, *i*, *i*, respectively

carry endless bands, and these drums being made to revolve, cause the bands to lead forward the dough and to compress it into a broad sheet, of such a thickness as may be desired.

The endless bands are kept tight by rollers *k*, *l*, mounted in weighted levers; and the series of drums *h*, *h*, *h*, and *i*, *i*, *i*, are placed in such positions to each other, as to cause the bands to approximate as the dough advances.

When the dough has been thus compressed to the required thickness, it is carried onward in a sheet between other endless parallel bands, extended over two series of rollers *m*, *m*, *n*, *n*, *o*, *o*, *p*, *p*.

The rollers *m*, *m*, and *p*, *p*, keep the parallel bands tightly distended. The rollers *n*, *n*, have points or spurs set in their peripheries, which, as the sheet of dough passes, pricks it through; and the rollers *o*, *o*, have circular cutters, which slit the sheet of dough into suitable widths.

After the dough has passed from between the rollers *p*, *p*, it falls on to iron plates *q*, *q*, which are supported by a series of rollers *r*, *r*, *r*, and gradually carried forward; the dough, in its progress, passes under a roller *s*, which has a series of longitudinal blades acting as cutting edges; these blades sever the dough transversely, and thereby it becomes cut up into square forms for biscuits.

The leading principle of my oven, consists in forming a series of chambers one over the other, which may be regarded as constituting one oven, or as a series of ovens; and they are heated by the same fluid medium, which may be steam, oil, or other fluid, so as to obtain economy of fuel, space and durability, uniformity of temperature, and facility of regulation and working. Fig. 7, represents a vertical and longitudinal section of a

pile of ovens designed for the employment of steam as the heating medium.

The boiler is represented as placed underneath the pile of ovens, but this may, of course, be placed wherever convenience may render it more desirable : *a*, is the ash-pit ; *b*, the furnace ; *c*, the boiler ; *d*, the flue, the course of which, as indicated by the arrows, passes under the boiler, round the end over the top on to the chimney *e*. Water is supplied by the tube *f*, so as to nearly fill the boiler ; *g*, *g*, are the vertical steam mains, which ascend to the top of the ovens, where they are united by an arched pipe *h*, into a single tube *i*, on the top of which is placed a safety valve *j*. In this example of my patent ovens, a series of seven marked *l*, *l*, *l*, are exhibited, the divisions between which are made by a series of eight metallic steam boxes *m*, *m*, set in the brickwork. These steam boxes are supplied from the boiler, through the medium of the vertical mains and the curved branch pipes *n*, *n*, each of which is provided with a stop-cock, to regulate or cut off the steam as occasion may require.

In the front of the oven is fixed a cast iron plate, with apertures for the doors, an edge view of which is seen in the longitudinal section, at *p*, *p*, *p*. These parts are cast with chipping pieces, and are nicely fitted so as to make them nearly steam-tight.

The curved pipes *n*, *n*, take an inclination downward, from the steam boxes to the vertical mains, which permits any water resulting from condensation to run back into the boiler, and the steam likewise readily to ascend them.

As the heat required for baking varies from 300 to 350 degrees of Fahrenheit's thermometer, the pressure exerted by the steam at those temperatures is so con-

siderable, as to require very strong recipients; my steam boxes are accordingly made of prodigious strength, and so as to resist a much greater pressure than can easily be applied to them. They are formed by two stout cast iron plates, with flanges at the sides, and having at equal distances over their areas a series of countersunk bosses, which bosses are made to meet together, excepting an interposed packing, and they are then bolted together.

It is not, however, necessary to employ steam as the heating medium in ovens upon my patent construction. In some cases I may employ a fluid which exerts no pressure at the temperature required for baking, such as oil, for instance: in that case, my vessels need not possess extraordinary strength, and the arrangement of them may be, as shown in fig. 8, where *a*, exhibits a hollow cylindrical or annular boiler, with a fire in the middle. From the top of the boiler, or rather heating vessel, a pipe *b*, ascends, and is connected to the upper box *m*; and from the bottom of the boiler, or heater, another pipe *c*, communicates with the lowest box *m*, of the series. By this arrangement, the greater heat in the upper part of the vessel *a*, causes the fluid to ascend the pipe *b*, and to discharge itself into the uppermost of the boxes *m*, whence it runs from one to the other downwards, through the lateral connexions, or pipes of communication, to the lower vessel, and thence by the pipe *c*, into the boiler. The circulation of the fluid is thus promoted on the well-known principle adopted in heating buildings by hot water. In employing oil as the heating medium, a small pipe should be put in the upper box *m*, and left open to the atmosphere.

The oven for baking sea bread, or biscuit, may be of the same kind as those already described, but with the

partitions containing the heating medium at not more than from one and a half to two inches apart.

I proceed to give an example of the application of heated air to an oven, constituted on the same principle, but which, for economy, combines the subsequent application of the air to kiln drying. This arrangement is represented in the diagram marked fig. 9, where *a*, shows a furnace, and *b*, *b*, a flue, leading into the throat of a chimney at *c*. At *d*, or any more convenient situation, a blowing machine may be employed to propel atmospheric air, through a tube *e*, into a broad flat vessel *f*; hence it passes through a connecter *g*, into *h*, and successively through a similar arrangement of vessels and connecters, which conducts the air ultimately into a long flat open trough *t*, over the top of which an endless band (similar to those in the before-described kilns) is made to traverse, and on the surface of which is distributed the grain to be dried. The biscuits are deposited in the chambers, marked *w*, *w*.

For the purpose of charging the ovens with the loaves, and discharging them of the same, I employ a platform, which is capable of being elevated or depressed to the required levels, for working the several ovens. A making-up table is fixed upon this platform, where the bakers stand and prepare the loaves for the peeler, who, with a short peel, places them upon a large iron plate of nearly the area of the oven, which plate rests upon a bearing frame, fixed also upon the platform. When the plate is filled and raised up to a level with the oven, the plate is projected into the oven by the aid of a winch and chain; and when the bread is sufficiently baked, the plate is drawn out by the same means.

This mode of charging is not essential to the ovens, as they may be charged in the usual way by the peeler,

The platform I suspend to the ceiling, or other fixed points above, by four chains or ropes, one at each corner of the platform; and these chains are conducted by pulleys to a barrel, on which they are wound or unwound by the common mechanism employed in cranes. I make no claim of patent right to this last described appendage to my ovens, (which may be considerably varied in its structure as circumstances or convenience may render necessary,) but I confine my claims to the arrangement of a series of ovens placed one over the other, with the heating medium between them, not merely in the precise manner described, but including all modifications of the same.—[*Inrolled in the Inrolment Office, July,* 1833.]

Specification drawn by the Patentee.

To WILLIAM BELL, *of Edinburgh, in the kingdom of Scotland, Esq., for improvements in his invention of heating and evaporating fluids.*—[Sealed 11th May, 1837.]

THE invention specified under this patent, consists in applying heated air *unmixed* with the gases evolved in the combustion of fuel for the purposes of evaporation generally. We presume that the Patentee's object is to get rid of the ill effect of the direct action of the heat upon the metal of tubular locomotive boilers, as he has described his invention as adapted to a common Stephenson boiler of a railway engine.

The invention is proposed to be carried into effect by means of tubes similarly situated to those usually employed in tubular boilers, or in boilers or vessels used for all purposes of evaporation, which tubes are

connected with chambers or lead from pipes placed within the furnace, which are supplied with air by means of blowing apparatus. The air becoming heated in the chamber in passing through the tubes, gives off its heat to the surrounding fluid intended to be evaporated, and after having proceeded through the boiler, is conducted to a tank where it may give off the remaining portion of its caloric to prepare the water contained in the tank for being fed into the boiler.

The Patentee claims the application of tubes or other such channels for conducting hot air unmixed with the gases given off by the combustion of the fuel employed through evaporating vessels, such air being heated by the furnace of the boiler.—[*Inrolled in the Inrolment Office, November,* 1837.]

To THOMAS BAYLIS, *of Tamworth, in the county of Stafford, civil engineer, for certain improvements in heating and evaporating fluids, being a communication from a foreigner residing abroad.*—[Sealed 6th May, 1837.]

THESE improvements in heating and evaporating fluids, consist in the employment of vertical steam chambers protruding up from the bottom of an ordinary evaporating pan, whereby brine or other saline solutions may be evaporated with increased facility. Plate XIII., fig. 1, represents a vertical section of this apparatus: *a, a,* is the ordinary evaporating pan; *b, b,* are hollow steam chambers placed transversely therein, for the purpose of heating the fluid intended to be evaporated; *c,* is a channel extending along the side of the vessel for conducting steam to the chambers *b,* the pan being

provided at the opposite side with a similar channel for the purpose of carrying off the condensation.

The proposed advantage of this apparatus is, that on the evaporation of the solution the salt will fall on to the bottom of the pan *d, d, d,* and the heating surface will be acting at the tops of the chamber above the crystallized matter, and, therefore, the free conduction of heat will not be impeded as in the ordinary construction of evaporating pans.

Fig. 2, shows a variation of the above, in which the protruding chambers are affixed to a pan furnished with a false bottom of the usual construction. The Patentee only claims the employment of vertically projecting steam chambers in evaporating pans when used for the purpose of evaporating brine or other saline solutions. —[*Inrolled in the Inrolment Office, November,* 1837.]

To JOHN ERICSSON, *of Liverpool, in the county palatine of Lancaster, civil engineer, for his invention of an improved engine for communicating power for mechanical purposes.*—[Sealed 9th February, 1832.]

THIS is a sort of rotary engine to be worked by the elastic force of steam, or by the weight or pressure of water. The working parts are endorsed within an hemispherical box, and the piston, if so we may call it, consists of two parts which roll round the interior of the box upon a ball and socket joint, forming something like wedge-shaped apertures for the elastic force of the steam or pressure of the water to act against the sides, and thereby giving rotary motion to a central shaft, from which, by means of toothed gear, machinery is to be driven.

Plate XIII., fig. 3, represents the apparatus partly in section; *a, a, a,* is the hemispherical box taken in vertical section through the middle; *b,* is a disc wheel formed on its inner face as a frustrum of a cone *c,* affixed to the centre, of which, in front, is a ball *d*; and from the back part of this disc wheel, the shaft *e,* extends, which communicates the power for driving other machinery.

Another disc wheel *f,* having an hemispherical hollow or socket as in its shaft shown by dots, turns upon the ball *d,* as one of its centres of rotation, and its other pivot is at *g,* in the periphery of the hemispherical case. Extending from the cone *c,* there are two wings, the one seen at *h,* the other in dots, and as the disc *f,* rolls round, bearing against the face of the cone *c,* these wings slide through narrow apertures in the disc *f,* as shown at *i.*

Openings are made on each side of the hemispherical box, with which tubes communicate, the one for the admission of steam into the machine, the other for its exit.

The working parts or edges being all properly packed to render them steam tight, it will be understood that on steam being admitted into the hemispherical box from one side, and occupying the apparently wedge-formed space *k,* between the discs, that its elastic force will press against the wing *h,* and force it with both the disc wheels *b,* and *f,* round the interior of the hemispherical box, the steam chamber enlarging, and the wing *h,* sliding out from the disc *f,* as it rises, and sliding in again, contracting the chamber as it descends, thereby allowing the other wing, shown by dots, to come round and assume the same positions. By these means, when one wing has passed a certain point of the rotation, the exit steam-way becomes open for the

escape of the eduction steam on the farther side of the box, and the rising wing with its expanding chamber receives the induction steam on this side of the box, thereby continuing the rotary movement of the discs and the wings.

There are some minor particulars set out in the specification as to the detail of the construction of the packing and some other parts of the machine, but enough, we trust, is here given to show the Patentee's intention, and also to show the inferiority of this plan (however ingenious) to the ordinary construction of reciprocating steam engines.—[*Inrolled in the Inrolment Office, August,* 1832.]

To COLLIN SMITH, *of Great St. Helen's, Bishopsgate, in the city of London, merchant, in consequence of a communication made to him by a certain foreigner residing abroad, for an invention of an apparatus or machine for regulating the course and action of fluids and liquors, which apparatus or machine is applicable to various purposes.*—[Sealed 31st January, 1832.]

THE Patentee states that this invention is founded upon a strict and mathematical application of the law of equilibrium, and a new mechanical arrangement susceptible of sure and convenient use. The descriptive part of the specification is framed in a very high-flown style of diction, but we shall endeavour to make the subject understood by a few simple words, accompanied by a diagram such as we find appended to the original document.

In Plate XIII., fig. 4, may be considered to repre-

sent a vertical section of a tank *a, a, a,* containing water, from the lower part of which a bent tube *b,* forms a communication with a vessel *c.* At the lower part of this vessel *c,* a diaphragm *d,* is fixed, through an aperture, in the centre of which the water is intended to flow from the tank *a,* into the vessel *c,* and in the side of this vessel the discharge cock *e,* is inserted. Within the vessel *c,* a float *f,* is placed, fixed upon a perpendicular rod *g,* which passes down through the aperture; and at the lower end of this rod there is a conical plug *h,* intended to act as a valve.

It will now be perceived that the pressure of the water in the tank will cause it to flow through the bent pipe and through the aperture into the vessel *c,* and in so doing will necessarily raise the float *f,* upon its surface, which, in rising, will draw up the conical plug *h,* and close the water-way. Hence, the weight of the column of water contained in the small vessel *c,* will be all the pressure that can be exerted upon the discharging aperture or cock *e,* for as the water from the tank can only flow into this vessel when the float descends and opens the valve, it follows that the column in the vessel *c,* will be always the same, whatever may be the height of the water in the tank.

There are a variety of modifications of this simple principle proposed, which it will not be necessary for us to describe, as the leading feature is expressed in the above; mathematical proportion is to be observed between the dimensions of the float and of the valve, and also between these figures, that is, the float may be cylindrical, conical, or spherical, and the valve conical, spherical, or elliptical.

One modification of this contrivance is pointed out as applicable to lamps, for the purpose of equallizing

the pressure of the oil, and causing it to feed the burner uniformly.

The Patentee says, in conclusion, that "the invention is not limited to the examples shown; it may be applied to a variety of experiments in physics as well as in many applications of mechanics, fluids, and liquids, to the arts, handicraft, and manufactures.—[*Inrolled in the Inrolment Office, July,* 1832.]

To WILLIAM BRUCE, *of Edinburgh, in the kingdom of Scotland, baker, for certain improvements in machinery or apparatus for making ships' and other biscuits, or bread, being a communication from a foreigner residing abroad.*—[Sealed 14th August, 1834.]

THE subjects of this invention are, the construction or arrangement of two machines; the first for kneading dough for making biscuits, the second for rolling out such dough into suitable thicknesses and cutting it into forms for biscuits.

Plate XIII., fig. 5, represents, in elevation, the machine for kneading. It consists of a circular horizontal table *a*, which is fixed upon a vertical spindle *b*, and is made to revolve in a wooden framework by means of toothed gear. On the upper surface of this table, two conical rollers *c*, and *d*, the one plain, the other fluted, are intended to revolve, for the purpose of squeezing and kneading the dough, which is to be placed on the table, and to pass under these rollers as the table goes round.

The axles of these conical rollers are mounted sliding frames which move up and down freely in slots

formed in two horizontal rails, and they are pressed down by means of weighted levers above.

When dough, previously mixed and partially kneaded, has been placed upon the table *a*, the winch *e*, is to be turned, which is governed by a fly-wheel, or a pulley and strap, from any first mover, may be applied to the short axle *f*, which carries a pinion taking into a circle of teeth at the underside of the table *a*. The table being, by these means, made to revolve, the dough will be first carried under one roller, then under the other, in succession. The plain roller *c*, spreads out the dough to its required thickness, the fluted roller *d*, crimps it up, and thereby kneads it.

Behind these rollers (and therefore not clearly seen in the figure) there are affixed to the framework two curved scrapers, the lower edges of which bear upon the face of the horizontal table. The positions in which these curved scrapers stand, are such as to receive between them the dough in a broad thin sheet after it has passed under the fluted roller *d*, and to scrape and compress it into a narrow compass before it is led under the plain roller *c*. In this way the dough is worked round the table until it has become sufficiently kneaded, and is then taken in a thin broad sheet as it is delivered from under the plain roller, and carried to the second machine to be formed into biscuits.

Fig. 6, represents, in longitudinal sectional elevation, the second machine, in which *a*, is a feeding table, whereon the sheet of dough brought from the former machine is to be placed, and led forward between a pair of drums or cylindrical rollers *b*, *c*. These rollers, with the other parts of the machine, are mounted in suitable framework, and are made to revolve by means of toothed gear.

A winch, or other moving power is applied to the axle of the upper roller *b*, which, by means of a pair of corresponding toothed wheels, fixed upon the axles of these two rollers, causes them to revolve together, and to conduct the sheet of dough, of one uniform thickness, forward to the cutting cylindrical roller *d*. This cutting roller is also turned by toothed gear, and has a series of circular cutters or stamps *e*, *e*, *e*, set round its periphery, and as many in width, side by side, as may be required for the width of the sheet of dough. These cutters, as the roller *d*, revolves, come against the sheet of dough on the surface of the roller *c*, and stamp or cut out the forms of the biscuits, which they carry to the endless cloth *f*, below; the surplus dough, or that which is left between the circular pieces cut out, being scraped off the roller, falls down into a receiver below, from whence it may be taken and worked up again into a flat sheet as before.

There is a peculiarity in the construction of these cutters, which will be understood by reference to the enlarged sectional figure of one of them, shown at fig. 7. It will be perceived, that within each circular cutter *e*, there is a piston *g*, which has a tail-piece *h*, extending within the periphery of the roller *d*, and as the roller comes round, carrying the forms of dough for the biscuits in the sockets of the respective cutters, that a stationary tappet or cam *i*, act at the proper time against these tail-pieces *h*, severally, and cause the piston to push out the biscuits on to the endless cloth *f*, by the progressive advance of which they are carried forward into a situation convenient to be taken and placed in the oven.

These are the leading features of this invention; and the Patentee says, in conclusion, that he does not claim any of the parts of this apparatus separately as new,

but he claims the general arrangement subject to such modification, as circumstance or convenience may render desirable; and he does specifically claim, first, the combination of a revolving kneading table with conical rollers, and the parts which work them, when the same are used for the purpose of kneading dough in the process of making ships' or other biscuits, or bread; and second, the construction of the cylinder, with cutting instruments, as described when used for the purpose of cutting or forming of ships' or other biscuits, or bread, as described.—[*Inrolled in the Inrolment Office, February*, 1835.]

To JOHN HOLT, *the younger, of Whitby, in the county of York, rope-maker, for his invention of the application of a mode or process for preparing and manufacturing certain fibrous substances.*—[Sealed 28th April, 1832.]

THIS invention applies to the prepararion of New Zealand and Manilla hemp and flax, the fibres of which, it is said, are so firmly held together by a strong adhesive matter that, after breaking and heckling it in the way that other flax and hemp is treated, it will not absorb tar, and, therefore, is unfit for the manufacture of ropes.

The improvement proposed is, after breaking the hard parts of the flax and hemp in the usual manner, to steep it in a strong solution of alkali, such as potash, pearlash, soda, or soap and water, for the space of twenty-four hours, more or less, according to the quality or condition of the flax or hemp, and which alkaline liquor may be applied in a hot or cold state.

After this steeping, the material is to be spread out in thin portions and placed in a tray, which has a grated

bottom, that is, having a bottom formed of triangular bars. Another tray, of a similar construction, is then to be placed upon the material in the former tray, and any required weight added to create pressure. The upper tray is then to be moved to and fro for the purpose of causing the material to be rubbed between the bars of the two trays, for the purpose of more effectually breaking off and getting rid of the woody parts of the hemp or flax which will fall through the lower grating in small pieces, and leave the fibres of the flax or hemp free and clean.

It is to be observed, that this steeping and rubbing may be performed either before or after the material has been spun or twisted into a coarse yarn for making ropes; and, that after the operation, it will be found to absorb tar with the same readiness that flax or hemp of European growth will do.—[*Inrolled in the Inrolment Office, October*, 1832.]

To JOHN MACNEILL, *of Parliament-street, in the county of Middlesex, civil-engineer, for his invention of improvements in making or mending turnpike or common roads.*—[Sealed 11th January, 1827.]

THE object of the Patentee is to combine iron with the stony or earthy materials of which the surfaces of roads are usually made; and to effect this object, he says, "I proceed, when making a new road, to obtain a suitable surface, and bring the same to a condition for laying on gravel or broken stones of various descriptions, for producing a strong hard surface; but instead of completing the surface of the road solely with gravel or

broken stones, I apply a quantity of pieces of wrought or cast iron, which I mix with the broken stones." These pieces of iron may be of any shape, but he prefers cubes of about an inch.

The quantity of iron to be used with any given quantity of broken stones or gravel, must depend upon the degree of hardness and strength required; and having laid the foundation, and spread the broken stones in the ordinary way, the pieces of iron are to be distributed equally over the whole surface; the Patentee says, that they may lie from one to three inches apart all over the road, when, by rolling the surface, or by the ordinary traffic, these pieces of iron will become imbedded with the stony materials.

The surface of the road will, by these means, become in a great measure covered with iron consolidated with the stony or earthy matters; and when so situated, by oxydising, the metal will be found to adhere to the stones, and to bind and hold fast the whole of the materials on the surface in a firm, solid, and hard mass.

The Patentee refers to attempts which have been made to pave carriage-ways with blocks or slabs of iron; his invention does, however, in no way relate to paving, but only to mixing iron in small pieces with the broken stones and gravel used for forming what are commonly called Macadamised roads; and he says, in conclusion, "What I claim is, the mode above described, of combining iron with ordinary road-making materials for giving solidity and strength to roads, as above decribed."—[*Inrolled in the Inrolment Office, July*, 1837.]

ORIGINAL COMMUNICATION.

DAY AND NIGHT TELEGRAPH.—BY MR. E. B. ROWLEY, R.N.

(To the Editor of the London Journal of Arts.)

The principle on which this telegraph is constructed, is the giving an impulse to a column of air in a leaden tube, extending from station to station, and which, from experiment, is found to travel at the rate of one mile in five seconds. This, at first, may appear incredible, as wind, during the most violent hurricane, travels only one hundred miles per hour: but it appears that air in a tube obeys the same law as water, being to all intents and purposes a solid body; consequently, when one foot of air is injected into a pipe, say ten miles in length and half an inch in diameter, the body or column of air which the said pipe always contains is impelled forward, and in the course of a minute one foot escapes at the other extremity.

To apply this to telegraphic purposes, leaden pipes are to be laid down from station to station, the distance between which is fixed at ten miles, each pipe at one end being connected with an air-receiver, inverted in water like a gasometer, and each pipe having a separate stop-cock, the other end of each pipe being immersed in water contained in small white glass bottles. The pressure of air from the receiver, gives an impulse to the air in the pipe of which the stop-cock is turned, and the effect is an instantaneous bubbling of the air at the other extremity of the pipe as it escapes through the water.

Reference is now given to the sketches of the model.

Fig 8, Plate XIII.; *a*, an air-receiver supplied by an air-pump and inverted in water; *b*, tube leading from the same and connected with the five pipes *, *a*, *b*, *c*, *d*, each furnished with a stop-cock, the one with the star denoting the preparatory signal, the rest speak for themselves.

It will be perceived each pipe is conducted to the next station,

and terminates by being immersed in a bottle three-fourths full of water, and similarly marked. When the stop-cock *a*, is turned for a second, air being admitted from the receiver, bubbling is instantaneously perceived in bottle *a*. Fig. 9, shows how each alphabetical pipe can be made to communicate to and fro. The signal one must always be distinct; *a*, an air-receiver; *b*, a tube leading from the same and furnished with a stop-cock, from which proceeds the signal and alphabetical pipes: the latter are supplied with four stop-cocks constantly secured.

Telegraphic intelligence being about to be communicated, the stop-cock *, is turned at the south station. When the bubbling is perceived at the north station, making noise sufficient to attract attention, the signal-man turns his stop-cock *, to give notice he is ready to attend, and immediately opens all the stop-cocks of the bottles *a*, *b*, *c*, *d*.

It is clear that with respect to the cost of a telegraph of this construction, the piping would form the most considerable item. Lead piping can be supplied at 20*l*. per ton, and a ton weight of this piping would make a mile in length, so that the expense of ten miles with six pipes, would be 1200*l*. This teleg aph would not require being attended to by a scientific person, any one of ordinary intelligence would be capable of managing it, and transmitting the desired communication.

The pipes in the model are 500 feet long, and not more than one-sixth part of a second elapses ere the impulse of air travels that distance. A small screw would decide the question, all that would be necessary would be to have ten miles of piping soldered together, which could easily be done, there being no occasion to uncoil the same. By immersing one end in a bottle of water, and propelling a quantity of air into the other, it is most probable that in one minute the air would be perceived escaping through the water.

BILL BEFORE PARLIAMENT,

FOR THE BETTER ENCOURAGEMENT OF THE ARTS AND MANUFACTURES, AND SECURING TO INDIVIDUALS THE BENEFIT OF THEIR INVENTIONS FOR A LIMITED TIME.

THE third essay of Messrs. Mackinnon and Baines, for improving the laws of patents, is supposed to be now before Parliament; but the truth is, the subject has been altogether abandoned, and in its place has been substituted a bill for giving license to manufacturers to maintain, for twelve months, the exclusive use of any new pattern or design which they may bring out, for each of which privileges they are to pay severally 10*l*. to uphold a cumbrous board of commissioners, secretary, registrar deputy, clerk, messengers, &c. &c., which this act is intended to create.

With respect to such a board of commissioners, &c., our opinion has been before made known in reference to the former introductions of patent bills; and we have but a slight amendment now to make to the opinions already recorded, which is, that in the present position, it is not in the slightest degree probable that the profits (we should say the whole amount for licenses taken under such bill) will pay the cost of pens and ink for the secretary, or the expense of shoe-leather idly kicked out by the loitering messengers.

With regard to the uselessness of the bill, indeed, its injurious tendency, as respects the calico-printers of Manchester, we shall let them speak for themselves, after we have recited the provisions of that bill, and, in conclusion, make a very few remarks as to its operation on other branches of manufacture.

THE BILL.

Whereas it is expedient for the greater encouragement of the arts and manufactures in these realms, that protection should be afforded to the inventors of new and useful improvements, by vesting the property thereof in them, and that the same should be still further increased and extended to all persons whatsoever, who shall be desirous of availing themselves of this act.

And whereas an act was made in the twenty-seventh year of the reign of his late Majesty King George the Third, intituled "An act for the encouragement of the arts of designing and printing linens, cottons, calicoes and muslins, by vesting the properties thereof in the designers, printers, and proprietors for a limited time;" which said act, was by another act made in the twenty-ninth year of his said late Majesty's reign, continued from the expiration thereof until the first day of July, one thousand seven hundred and ninety-four; and was afterwards, by another act made in the thirty-fourth year of the said reign, made perpetual, and the provisions thereof extended.

Be it therefore enacted, by the Queen's most excellent Majesty, by and with the advice and consent of the Lords spiritual and temporal, and Commons, in this present Parliament assembled, and by the authority of the same, that the said recited acts of the twenty-seventh, the twenty-ninth, and the thirty-fourth years of the reign of King George the Third, shall be, and the same are hereby repealed.

And be it enacted, that any person who shall hereafter invent, design, or contrive, or shall become the proprietor of any invention, design, or contrivance, whereby, in the opinion of such inventor, designer, contriver, or proprietor, some new and beneficial operation or result shall be obtained in any art, science, manufacture, or any calling whatsoever, may and shall hereafter have the sole right and property in every such new invention, design, or contrivance, for, and during the term of *twelve* calendar months from the time of registering the same, in manner and under the regulations herein in that behalf mentioned.

And be it enacted, that every inventor, designer, contriver, or proprietor, who shall be desirous of availing himself of the provisions of this act, shall deposit, or cause to be deposited, in the custody of the commissioners to be appointed under and by virtue of this act, in the manner and under the regulations hereinafter set forth, or which shall be set forth, under and by virtue of the provisions herein contained, a full, true, correct and perfect fac-simile, model or specimen, print, drawing or design of his invention, design

or contrivance, with the name and actual abode of such inventor, designer, contriver, or proprietor attached thereto, in such manner as to the said commissioners shall seem expedient, and shall also pay the sums of money in the manner and at the times hereinafter in that behalf respectively provided.

And be it enacted, that the said commissioners shall, and they are hereby authorised and required to approve of and provide some fit and proper place for the reception of all such fac-similes, models, or specimens, prints, drawings or designs, as shall hereafter be deposited in their custody under the provisions of this act, and shall cause the same to be preserved and exposed to public inspection in as perfect and commodious a manner, and under such rules, regulations, charges and expenses, as to the said commissioners shall seem fitting and expedient, during the space of *twelve* calendar months from the time of the deposit thereof respectively.

And be it enacted, that every person who shall be desirous of availing himself of the provisions of this act shall, at the time of depositing such fac-simile, model or specimen, print, drawing or design as aforesaid, pay, or cause to be paid to the said commissioners, or on their account, the sum of *ten* pounds, and shall thereupon be entitled to receive from the said commissioners a certificate of license for the same, to be sealed with the seal of the said commissioners, certifying the date of such deposit, together with a general outline or description of the fac-simile, model or specimen to which the same shall relate.

And be it enacted, that if any person whatsoever shall at any time during the continuance of the said term of *twelve* calendar months, bearing date from the day of the deposit of such fac-simile, model, specimen, print, drawing, or design, either directly or indirectly, make, vend, or put in practice, or in anywise imitate, counterfeit, or resemble the several inventions, designs, or contrivances to which the same shall respectively refer; or shall make, or cause to be made, any addition thereto or subtraction from the same, whereby to pretend himself the inventor, designer, or contriver thereof, without the license or consent in writing of the said person or persons whose name or names shall appear on the said fac-simile,

model, or specimen relating thereto, and deposited as aforesaid; and shall also appear in the said certificate of license, or of his or their assigns; or if any person shall upon such thing not having been purchased from the person or persons whose names shall appear on the said model or specimen, and certificate of license relating thereto, or his or their assigns, or not having the license or consent in writing of such person or persons, or his or their assigns, write, paint, print, mould, cast, carve, engrave, stamp, or otherwise mark the word "Licensed," or "By the Queen's License," or any words of the like kind, meaning, or import, or with a view of imitating or counterfeiting the stamp, mark, or other device of the person or persons so having obtained such certificate of license as aforesaid, or shall in any other manner imitate or counterfeit the stamp or mark, or other device, of such person or persons, he shall for every such offence be liable to a penalty of *fifty* pounds, to be recovered by action of debt, bill, plaint, process or information, in any of her Majesty's Courts of Record at Westminster, or in Ireland, or before any *two* or more of her Majesty's Justices of Peace, at their General or adjourned Quarter Sessions of the Peace assembled, or in the Court of Sessions in Scotland, *one-half* to her Majesty, her heirs, and successors, and the other to any person who shall sue for the same; provided always, that nothing herein contained shall be construed to extend to subject any person to any penalty in respect of stamping, or in any way marking the words "Licensed," or "By the Queen's License," upon any thing made for the sole vending of which a certificate of license before obtained shall have expired; and provided always, that nothing herein contained shall be construed to exempt any person or persons who shall hereafter take advantage of the provisions of this act from any liability to which he or they may subject himself or themselves in any action, suit, or other proceeding to which they are now or may hereafter become subject, by reason of any infringement, or alleged infringement, of any invention or contrivance for which her Majesty's Royal Letters Patent have been already, or may hereafter be obtained; and provided also, that no invention, model, or contrivance for which a certificate of license shall have been granted under the

provisions of this act, shall be capable of being made the subject of Letters Patent therefor at any time after the date of such certificate; nor shall the same be capable of being made the subject of a second license therefor under the provisions of this act.

Provided always nevertheless, and be it enacted, that every person who shall invent, design, or print, or cause to be designed or printed, or become the proprietor of any original pattern or patterns for printing linens, cottons, calicoes, or muslins, shall, notwithstanding any thing herein contained, have, and continue to have, the sole right and liberty of printing and re-printing the same for the term of *three* months, to commence from the day of the first publication thereof, which shall be truly printed, with the name of the printer or proprietor at each end of every such piece of linen, cotton, calico, or muslin; and in like manner as they were entitled if the said three several herein recited acts of the twenty-seventh, twenty-ninth, and thirty-fourth years of the reign of King George the Third had not been repealed; and shall likewise be entitled to sue for, and recover, in such and the like manner as hereinbefore set forth, such penalty of *fifty* pounds against all persons whatsoever who shall, within the said period of *three* months, print or re-print, work or copy, or cause to be printed, re-printed, worked, or copied, such original pattern or patterns, or publish, sell, or expose to sale, or in any other manner dispose of any linen, cotton, calico, or muslin so printed (without the consent in writing of the proprietor or proprietors thereof first had and obtained), knowing the same to be so printed or re-printed without the consent of the proprietor or proprietors of such pattern.

And be it further enacted, that, for the purpose of carrying this act into execution, it shall be lawful for her Majesty, her heirs, and successors, by Charter or Letters Patent, under the Great Seal of the United Kingdom of Great Britain and Ireland, to erect and establish a Board of Commissioners to carry this act into execution; and by commission under the Great Seal, to appoint one person to be the chief of such commissioners, and *two* other fit and proper persons to be other commissioners of the said board, and from time to time to supply any vacancy in the number of the com-

missioners; and that until such vacancy shall be supplied, it shall be lawful for the surviving or remaining commissioners to act as if no such vacancy had occurred; and that the said commissioners shall hold their said offices during their good behaviour, and so long as they shall personally give their attendance upon their respective duties, and shall conduct themselves honestly and faithfully in the due execution of the duties of their said offices respectively.

And be it enacted, that the said commissioners shall be styled "The Commissioners for Inventions;" and the said commissioners, or any *two* of them, may sit from time to time, as they may deem expedient, as a Board of Commissioners for carrying this act into execution; and the said commissioners acting as such board, shall be, and are hereby empowered, by summons under their hands and seal, to require the attendance of all such persons as they may think fit to call before them upon any question or matter connected with, or relating to, the administration of the several powers, questions, matters, and things over which they shall have any jurisdiction or control by virtue of this act, and to examine all such persons upon oath, and to require and enforce the production upon oath of all deeds, models, drawings, designs, books, contracts, agreements, accounts, and writing, or copies thereof respectively, in anywise relating to any such question or matter, or thing; or, in lieu of requiring such oath as aforesaid, the said commissioners may, if they think fit, require any such person to make and subscribe a declaration of the truth of the matters respecting which he shall have been or shall be so examined.

And be it enacted, that the said commissioners shall cause to be made a seal of the said board, and shall cause to be sealed or stamped therewith all rules, orders, and regulations made by them in pursuance of this act; and all such rules, orders, and regulations, or copies thereof, purporting to be sealed or stamped with the seal of the said board, shall be received as evidence of the same respectively, without any further proof thereof; and no such rule, order, or regulation, or copy shall be valid, or have any force or effect, unless the same shall be so sealed or stamped as aforesaid.

And be it enacted, and the said commissioners are hereby au-

thorised and empowered, from time to time, to appoint such persons as they may think fit, to be a secretary or secretaries, registrar or registrars, and all such clerks, messengers, and other officers as they shall deem necessary, and from time to time to remove the same or any of them, and to appoint others in their stead; provided always, that the amount of the salaries of all officers to be from time to time appointed by the said commissioners, shall be regulated by the commissioners of her Majesty's Treasury, or any three or more of them.

And be it further enacted, that every commissioner to be appointed by virtue of this act shall, before he shall be capable of acting in the execution of any of the powers and authorities given by this act, take an oath in the presence of the Lord Chancellor to the effect following, (that is to say):—

> "I, A. B., do swear, that I will faithfully, impartially, and honestly, according to the best of my skill and knowledge, execute the several powers and trusts reposed in me as one of the Commissioners for Inventions, and that without favour or affection, prejudice or malice.
>
> "So help me God."

And any commissioner having once taken the said oath, shall not again be required to take the same so long as he shall continue in office.

And be it enacted, that it shall be lawful for the secretary of the said commissioners for the time being, and he is hereby authorised and required to receive and take the several fees and sums herein set forth; and the sums to be so received by the said secretary, and all other sums to be received by him under the provisions of this act, shall be by him paid *once* a-week, or oftener, as the said commissioners shall think fit to direct, into the Bank of England, to the credit of the said Commissioners for Inventions, to an account to be opened by them with the Governor and Company of the said Bank, to be intituled, "The Commissioners for Inventions' Account;" and all monies to be paid into the said account shall be subject to such regulations touching the payment in, investment, accounting for, and payment out, of the said monies as herein pro-

vided, or as the said commissioners, or any *two* or more of them, by an order to be signed by them shall, for the purposes of this act, direct and appoint.

And be it enacted, that from and after the commencement of this act, there shall be paid and payable out of the monies and securities standing to the said account, to be intituled, "The Commissioners for Inventions' Account," the yearly sums following, as and for salaries for the commissioners and other officers for the time being, hereinafter named; videlicet, to the chief commissioner of the said board, the sum of   to each of the other said commissioners of the said board   which said several sums shall be paid from time to time quarterly, free and clear from all taxes and deductions whatsover, on the *eleventh* day of *April*, the *eleventh* day of *July*, the *eleventh* day of *October*, and the *eleventh* day of *January*, in every year, by equal portions; the first payment thereof respectively to be made on the *eleventh* day of *April* next, after the *passing of this act*; and that if any person for the time being, holding either of the said offices shall die, resign, or be removed from the same, the executor or administrator of the person so dying, or the person so resigning or being removed, shall be entitled to receive such proportionable part of his salary as shall have accrued during the time that such person shall have executed his office since the last payment; and that the successor of any such person so dying, resigning, or being removed as aforesaid, shall entitled to receive such portion of his salary as shall be accruing or shall accrue from the day of such death, resignation, or removal.

And be it enacted, that if any commissioner, secretary, assistant secretary, registrar, deputy registrar, clerk, messenger, or any other officer or person whatsoever shall, for any thing done, or pretended to be done, under this act, or under colour of doing any thing under this act, fraudulently and wilfully demand or take, or appoint or allow any person whatsoever to take for him, or on his account, or for or on account of any person by him named or in trust for him, or for any other person by him named, any fee, emolument, gratuity, sum of money, or any thing of value whatsoever, other than is allowed by this act, or any rule, order, or regulation made, or to be

made, in pursuance of the provisions thereof, or shall directly, or indirectly be engaged or employed, and either as principal or agent in the procuring, maintaining, or opposing the grant of any license for any invention, or in any matter or thing connected therewith, save in the performance of the duties of his office as such commissioner, secretary, or assistant secretary, registrar, deputy registrar, clerk, messenger, or other officer, such person, when duly convicted thereof, shall forfeit and pay the sum of *five hundred* pounds, and be rendered incapable, and is hereby rendered incapable, of holding any office or place whatsoever, under her Majesty, her heirs, or successors.

And be it enacted, that the said commissioners shall, and they are hereby required forthwith, and from time to time, as it shall appear to them expedient, to make and issue such general orders as they shall think fit, for carrying the provisions of this act into execution, in respect of the several matters and things to be performed at the said office, and shall also, from time to time, make and establish such other rules and regulations, not being inconsistent with the enactments and provisions of this act, or of any general order to be made and issued as aforesaid, as they shall in their discretion think fit and proper for simplifying, establishing, and settling the practice to be henceforth in use relating to licenses for inventions, and from time to time to alter and rescind the same or any of them: provided always, that no general order of the said commissioners shall operate or take effect until the same shall have received the sanction and assent of the Lord High Chancellor.

And be it enacted, that all monies and securities which shall be hereafter at any time standing to the said account, intituled, "The Commissioners for Inventions' Account," shall be, in the first place charged and chargeable with the payment of all sums of money to be awarded in the manner aforesaid, to the several commissioners and other officers to be appointed for carrying this act into executon, and the various other expenses incidental thereto; and after providing for the several matters aforesaid, the surplus of all such monies and securities shall be carried over by the said commissioners on the *first* day of *February* in every year, and made part of the

consolidated fund of the United Kingdom of Great Britain and Ireland.

And be it enacted, that this act may be altered, amended or repealed by any act to be passed in this present session of Parliament.

And be it further enacted, that this act shall commence and take effect from and after *the passing thereof*, as to the appointment of the commissioners and other officers hereby authorised; and as to the other matters and things, from the *first* day of *January, one thousand eight hundred and thirty-nine.*

PATTERNS AND INVENTIONS BILL.

Manchester, January 22, 1838.

Gentlemen,—I have great pleasure in forwarding to you a copy of the resolution of the Manchester Calico Printers' Committee, passed at their meeting on Saturday the 20th inst.

As I am concerned for the Committee in their opposition to the Bill, I shall be obliged by any communication with which you may favour me in promotion of their object.

I am, gentlemen,
Your very obedient Servant,
THOMAS WHEELER.

Messrs. Newton and Berry.

Manchester, January 22, 1838.

At a meeting of the Committee of Calico Printers to oppose the passing of the above Bill, John Brooks, Esq., in the chair, it was moved by James Kershaw Esq.; seconded by John Burd, Esq.; and resolved,

That the thanks of this meeting be given to Messrs. Newton and Berry for the promptitude with which they called the attention of the Calico Printers to the Bill, and for supplying copies for general distribution, and that Mr. Wheeler send a copy of this resolution to those gentlemen.

(Signed) JOHN BROOKS, Chairman.

OBJECTIONS OF CALICO PRINTERS TO A BILL,

ENTITLED "A BILL FOR THE BETTER ENCOURAGEMENT OF THE ARTS AND MANUFACTURES, AND SECURING TO INDIVIDUALS THE BENEFIT OF THEIR INVENTIONS FOR A LIMITED TIME."

By the existing law, 34 Geo. III., c. 23, the *designer and printer, being the proprietor*, of any new and original pattern for printing linens, cottons, calicoes, or muslins, has the sole right of printing the same for three months; and any invasion of his right by a party *copying the design and selling prints therefrom*, subjects the offending party to an action on the case; the facts of the alleged invasion and the quantum of damage sustained, being both in the decision of a jury.

Although this act, which was a renewal of one passed in 1787, has been in existence from the year 1794, there is only one case on record of even an appeal to a jury upon it, whilst the trade has confessedly been growing year by year in importance.

In the year 1820, an unsuccessful attempt was made to legislate anew on the subject.

The present measure repeals the existing act, and provides for the deposit by designers of a specimen of their design, whereupon, and on paying 10*l*., they are to become entitled to a license conferring upon them the sole property in their design for twelve months.

It erects an arbitrary tribunal, in the shape of a paid Board of Commissioners, to sit at the Land's-end, if it so please them, by whom the licenses are to be granted, and with whom the specimens are to be lodged, and who are to have power at all times to make, alter, and rescind such general orders as they may think fit; and the orders, when assented to by the Lord Chancellor, are to have the effect of the law of the land. And in the case of rules and regulations not being what the bill terms "general orders," even this sanction is not required, but the rules and regulations of the commissioners become at once binding upon the public.

There is to be a corps of paid registrars, secretaries, clerks, and other officials, to carry out the orders of the Board of Commissioners.

The bill further provides, that if during the twelve months to which the license is to extend,—

"Any person shall, either directly or indirectly, make, *vend*, or put in practice, or in any way imitate, counterfeit, or resemble the several inventions, designs, or contrivances" to which the license shall refer, "or make, or cause to be made, any addition thereto or subtraction therefrom," whereby to "pretend himself the inventor, designer, or contributor," without the license of the party to whom the commissioners' license has been given, he shall be subject for every offence to a penalty of 50*l*.

The phraseology of this clause is very confused, but there is at least thus much intelligible :—

> "That even a shopkeeper cannot sell a yard of print which is the subject of a license, without having himself a license in writing from the original party licensed;
>
> "That no improvement can be made in any pattern, either by addition to, or subtraction from it;
>
> "That no printer can use the design of his own workmen, or produce a single piece for sale, or execute a single order; nor can a shopkeeper sell a yard of print, without having first ascertained, by a journey to the Board of Commissioners' Office, and by careful comparison and examination of the design with the various deposited patterns, that it does not possess any resemblance to them;
>
> "That no man can conduct his business without perpetual liability to litigation.
>
> "The penalties are to be 50*l*. for every offence, to be recovered summarily before two magistrates, or by action, and one-half of the penalty is to go to the informer. So that every printer, warehouseman, and shopkeeper, will be placed at the mercy of a parcel of common informers;
>
> "Every trader is to be subject to be at any time called, at the will of the commissioners, before them, without knowing wherefore, and to produce his books and papers to furnish evidence against himself in his transactions and dealings."

The provisions of the bill do not extend to Ireland, so that it s

made penal in England to do that which may be done with impunity in Ireland.

"It is important to state, that the measure has neither been called for by the trade, nor springs out of their expressed opinions, but that it has been brought into Parliament without the sanction of those deeply interested, and even without their knowledge; and thus a bill, having so plausible a title and preamble as to make it seem to be not only free from objection, but of great public advantage, is rendered the means of affecting most injuriously the interests of trade, and subjecting a very important manufacture to penal and disabling provisions; and the injury which the bill will inflict, whilst felt, as it must be, by all concerned in the trade, will fall with peculiar force upon the trader of small means and upon the shopkeeper.

"The opponents of the bill, therefore, whilst they carefully abstain from giving any opinion upon those parts of it which do not relate to the printers, respectfully submit that it ought not to pass in its present shape, but that all those clauses which affect the trade of calico printing ought to be expunged, and an express provision inserted exempting that trade from the operation of the measure."

As there is no doubt but this powerful remonstrance coming from such an opulent and influential body of manufacturers, will have due effect with the Legislature, we shall add but very few remarks, and those upon the five first clauses alone.

It appears to be intended from the language of the second clause, (language by the way not the most intelligible that was ever written), that a *little patent* for twelve months is to be granted to any person who shall fancy that he has done or found out something; that is, who, in his opinion, has designed or contrived "some new and beneficial operation or result in any art, science, manufacture or calling." And according to the third clause, he is to deposit a "full, true, correct and perfect fac-simile, model, or specimen, print, drawing, or design of his invention or contrivance."

The fourth clause provides a fit place for a museum, in which

the fac-simile models or designs, &c. are to be received and exhibited; and the fifth provides that on payment to some of the officers of the establishment to the sum of 10*l.* for each subject so deposited, a license shall be granted for the exclusive use of the said invention during the term of one year.

We will not stop to inquire how a new process or mode of manufacturing glass, or gilding, or of dyeing, or a thousand other operations connected with the arts is to be represented by a fac-simile, model, specimen, print, drawing, or design; there are unquestionably a multitude of other things which might be exhibited as specimens of art, particularly from the manufactories of Birmingham, Sheffield, and the Potteries—from Nottingham, Leicester, Coventry, and Norwich. But presuming this museum of practical science to be intended to be established in London (and we have a suspicious eye upon a certain popular exhibition of playthings), is it to be endured that before a manufacturer could dare to send into the world a new design, form, or fashion of candlestick, tea-pot, urn, tray, basin or pitcher, that he must first take his journey to London to consult the museum of practical science and its legislative board; or that every change of pattern which may be wrought in lace, hose, ribbons, or shawls, shall be taxed with a ten-pound license.

Our limits will not allow us now to enlarge upon this matter, though the theme is sufficiently prolific to fill a volume. We would only remark, that if these, and a thousand other designs of art, require protection, which they UNQUESTIONABLY DO, for a short space of time after their first introduction, why not give them by law a COPYRIGHT in the same simple sort of way, as that already existing with regard to designs printed on calico. There does not appear to be any difficulty in extending this copyright to almost every subject of design which can be conceived, by merely marking in some way upon the new article the name of the proprietor and the date of its first publication; this, we confidently believe, would effect the object desired, without an expensive board of commissioners, a 10*l.* license, a showy museum, or any of the inconveniences or labours above alluded to.

NOVEL INVENTION.

JOYCE'S HEATING APPARATUS.

WITH confidence it may be asserted, that no invention, connected with the arts and sciences, ever created so extensive and rapid a sensation within a few days as the new heating apparatus invented by Mr. Joyce has done. We understand that orders for more than three thousand stoves have been received at the Jerusalem Coffee-house in London, and that numerous applications for permission to sell by way of agency have been forwarded from all parts of the country.

As we believe no authorised notice of this invention has yet appeared in print, and that those which are before the public tend more to mislead than inform, we have thought it our duty to state so much of the matter as, under circumstances, we feel ourselves at liberty to explain, the specification of the invention not having yet been inrolled.

There are two features in this invention, the one is a stove of a peculiar construction; the other, a chemical preparation of materials for fuel.

As to the stoves, they are of a cylindrical form, of thin copper or iron, ornamented externally in various parts, and having a neat dome at top, and scroll feet at bottom, with internal arrangements for the passage of atmospheric air which escapes from the fire through a regulator in the dome; this regulator also acting as a damper, which determines the amount of draft, and consequently controls the combustion of the fuel within, thereby regulating the amount of heat evolved.

The most important feature of this invention is the fuel, a matter which, having been first chemically prepared, does not, during its combustion in these stoves, give out either smoke, smell, or any deleterious vapour, a fact which, however singular, has been witnessed by thousands.

It does not appear that this discovery is to be attributed to a very profound chemical knowledge, for the walks of chemical science

have been widely trodden by talented men of the first order who have passed by the principles which have been now called into action without developing them; neither has it arisen from accidental circumstances, for the Patentee has been many years engaged in the pursuit of the object he has now obtained; has approached it very gradually, and, by dint of unremitted perseverance and a multitude of other experiments, has, at last, reached the point he sought, beyond which he does not anticipate any further beneficial discoveries.

The principles on which this invention is founded, in our opinion, are fundamentally correct; and though they appear to have been overlooked by those who have before trodden in the same paths of science, yet the fact is unquestionable, that combustion is effected in these stoves without deleterious exhalation.

The materials are cheap, and readily to be obtained in all countries. It is said that a small cylindrical stove of eighteen inches high, and seven inches diameter, will give out heat enough to raise the atmosphere of a room of twenty-five feet square, from thirty to forty degrees above its natural temperature, and keep it at that heat for thirty hours without attention at the small cost of fourpence.

SCIENTIFIC NOTICES.

REPORT OF TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS.

(Continued from p. 182.)

March 7, 1837.

The President in the Chair.

"Account of a Machine for cleaning and deepening small rivers, in use on the Little Stour River, Kent; by W. B. Hays, A. Inst. C. E."

The application of this machine to scour out small rivers consists in taking advantage of an artificial head of water to force on, with

the assistance of a small current, a boat armed with scrapers. At the stern of the boat is lowered a vertical frame, with scrapers at the bottom, and to the sides of the boat, near the stern, are attached wings, which being opened out make a dam. Thus a small head of water may be obtained, and the boat is forced on; the mud and weeds being raked up are carried down to the mouth of the river.

"Drawing and Description of a Bridge erected over the River Calder, at Mirfield, Yorkshire, by William Bull, A. Inst. C. E."

This arch, composed of two ribs of fir timber, is 147 feet 6 inches span, 11 feet versed sine, 5 feet wide at the centre, and 8 feet at the abutments.

On Experiments on the strength of Materials. By Thomas Webster, M.A.; Sec. Inst. C.E."

The object of this paper was to point out the importance, in making experiments on the strength of materials, of beginning with weights sufficiently small. In the series of experiments on the strength of various timbers by Lieut. Denison, laid before the last meeting of the Institution, the first weights are in some cases too large; for, from the commencement, the deflection increases more rapidly than the imposed weight.

The points to be ascertained in all experiments of this kind are, first, the weight which a beam can bear, the elasticity being unimpaired, or the elastic weight; and, secondly, the breaking weight. So long as the deflection increases in exact proportion with the increase of the weight, we may consider that the elasticity is unimpaired; but if the deflection increases in a higher ratio, that is, if the deflection for one cwt. be *one* inch, and for two cwt. more than *two* inches, we may suspect that some violence is done to the elastic force of the material. Thus a guide is furnished us in our observations; the weight before this ratio is observed to change must be considered as the elastic weight. When a beam is to be

broken the effect of time should be noticed, and the increased deflection after a given number of seconds recorded.

The experiments of Lieut. Denison bear out these remarks; for it will be seen that the point at which he has noted the first permanent set is in very many cases immediately after the change which is here laid down as the condition for determining the elastic weight.

With respect to the strength of materials, Mr. Cotton stated that it had often occurred to him, whether, if a beam be loaded by ever so small a quantity beyond the elastic weight, this beam would not in time be broken. This consideration might, he thought, explain some apparent difficulties, as when a beam breaks suddenly without any increase in the weight, but having been loaded to the same amount for many years.

Mr. Hawkins mentioned a case, in which a beam that deflected too much had been sawn down its middle and bolted up, so that its depth was increased in the centre from 10 to 11 inches. The effect of this was that the deflection, instead of being about $1\frac{1}{4}$ inch, was on $\frac{1}{8}$th of an inch. Was this great increase of strength to be attributed to the increase of depth simply, or to the lower half having become a truss and the upper a strutt?

March 14, 1837.

The President in the Chair.

The decay of timber in contact with stone was discussed, and several instances were mentioned in which the only decayed part of timber was that in contact with stone. This decay is entirely obviated by inserting the wood in an iron shoe, or by placing a thin piece of iron betwixt the wood and the stone. Several cases were mentioned in which the iron shoe had been found a complete protection against dry rot and decay; a hard crust is formed on the timber in contact with iron, which seems effectually to preserve it. It was suggested that the system of grouting must contribute to the early decay of timber; bond timber had consequently been replaced by bond iron. Bond timber is used very generally at Man-

chester, and answers exceedingly well, but the high temperature of the buildings may be a preventive against the decay of the timber, as the walls are very soon dried.

The subject of the strength of materials was resumed from the last meeting, and especial reference was made to the experiments by Mr. Hodgkinson on the strength of iron girders, published in the Transactions of the Manchester Society. In this paper Mr. H. supposes the forces of extension and compression to have a ratio 1 : n ; and not that, within the elastic limit at least, this ratio is a ratio of equality. Also, these experiments are directed especially to determining the form of beam which will be strongest up to the instant of fracture ; or, in other words, the beam which will have the greatest breaking weight without any reference to the elastic weight.

These principles are contrary to those laid down by Tredgold, and to the opinions of many persons of great experience. Mr. Donkin and Mr. Francis Bramah maintained that within the elastic limit the forces of extension and compression are equal ; that consequently within this limit the deflection will be the same, whether the beam is laid with a particular edge highest or lowest ; that a beam, for instance, whose section is a triangle, will exhibit the same deflection within the elastic limit, whether the vertex or base of the triangle be laid uppermost ; beyond this limit, however, the case is different.

The strength of a beam, according to Mr. Hodgkinson's experiments, depends on the bottom flanche ; by increasing this he had made beams for which the breaking were 4000 the square inch of surface of section, whereas Tredgold's strongest forms were about 2500 the square inch.

March 21, 1837.

The President in the Chair.

"On the strength of Iron Girders, by W. B. Bray, A. Inst. C.E."

In this paper the author states the rules which had been given by Galileo, Tredgold, and Hodgkinson, for calculating the strength

of iron girders. He shows by a table that Galileo's rule must be utterly false when applied to girders having large bottom flanches. Applying this rule to two girders, one of which contains double the metal of the other, they ought to be of the same strength, whereas Mr. Hodgkinson's rule makes the former only one-half as strong as the latter. Tredgold gives no rule for the case of a large bottom flanche. Thus there appears great inconsistency in these rules and a formula applicable to all cases is still wanted.

"On Mr. Hodgkinson's Experiments on Cast Iron Girders, by Thomas Webster, M.A.; Sec. Inst. C.E."

The object of this paper was to detail the result of an examination of the above experiments, undertaken with the view of ascertaining whether those forms of beams recommended by Mr. Hodgkinson as requiring greater breaking weight have also a greater elastic weight than the more ordinary forms, with equal flanches at the top and bottom. The principle assumed by Tredgold (which also was the principle assumed by Dr. Young) is, that within the elastic limit the forces of extension and compression are equal; whereas Mr. Hodgkinson starts with the inquiry as to the law which connects the forces of extension and compression.

Mr. Hodgkinson's experiments must be viewed as directed entirely to determine the breaking weights, and the earlier weights are not set down in many of the experiments. The weights and deflections first recorded are in many cases very near the elastic weight and point of permanent set, so that there is great difficulty in applying the principle already laid down for determining the elastic weight. But in some of the experiments which have a long series of early weights, it will be seen on comparing the increase of deflection with the increase of weight, that this ratio changes from one of equality sooner in these forms than in those with equal flanches at the top and bottom. If then these beams with large bottom flanches do possess practical advantages, it may be from their allowing a violation of the elastic limit with comparative safety; this is a state of things, however, which ought never to be contemplated.

List of Patents

Granted in Scotland between 22d December, 1837, and 22d January, 1838.

To William Neale Clay, of West Bromwich, for improvements in the manufacture of iron.—29th December.

— James M'Nee, coach-maker, of George-street, Edinburgh; for an improvement or improvements in carriages.—13th January.

— Iehiel Franklin Norton, merchant, in Manchester, communicated to him by a foreigner residing abroad, for certain improvements in stoves and furnaces.—15th January.

— Daniel Stafford, of New North-street, Red Lion-square, London, for improvements in carriages.—15th January.

New Patents

SEALED IN ENGLAND, 1838.

To William Retland Izon, of Cambridge, for his invention of improvements applicable to steam-engines.—Sealed 4th January—6 months for inrolment.

To William Henry Nunn, of Whippenham, in the Isle of Wight, lace manufacturer, for his invention of improvements in the manufacture and in the making or producing of certain descriptions of lace and other ornamental fabrics.—Sealed 4th January—6 months for inrolment.

To Nathaniel Worsdell, of Crown-street, Liverpool, coach-builder, for his invention of improvements in apparatus to facilitate the conveyance of mail bags and

other parcels on railways or roads.—Sealed 4th January —6 months for inrolment.

To Bennett Woodcroft, of Mumps, in the township of Oldham, in the county of Lancaster, gentleman, for his invention of improvements in the construction of looms for weaving various sorts of cloths, which looms may be set in motion by any adequate power.—Sealed 4th January—6 months for inrolment.

To John Richardson, of Hutton, in the parish of Rudley, Yorkshire, for his invention of certain improvements in the method of covering buildings.—Sealed 4th January—2 months for inrolment.

To Charles Watt, of Manchester, in the county of Lancaster, lecturer on chemistry, and Thomas Rainforth Tebbutt, of the same place, merchant, for their invention of certain improvements in the manufacture of the oxides of lead, and also of the carbonate of lead.—Sealed 5th January—6 months for inrolment.

To William Wells, of Manchester, in the county of Lancaster, machine-maker, and Samuel Eccles, of the same place, merchant, for their invention of certain improvements in power-looms and in hand-looms for weaving plain and figured fabrics.—Sealed 5th January —6 months for inrolment.

To Charles Fitton, woollen manufacturer, and George Collier, mechanic, both of Camberworth Half, near Wakefield, in the county of York, for their invention of improvements in power-looms.—Sealed 11th January—6 months for inrolment.

To John Thornhill, of Ison-green, in the county of Nottingham, lace-maker, for his invention of improvements in the manufacture of lace.—Sealed 11th January —6 months for inrolment.

To John Edwards, of Lincoln's Inn-fields, in the county of Middlesex, pen-maker, for his invention of improvements in instruments used in writing.—Sealed 11th January—6 months for inrolment.

To Hugh Ford Bacon, of Fen Drayton, in the county of Cambridge, clerk, for his invention of an improved apparatus for regulating the flow or supply of gas through pipes or gas burners, with a view to uniformity of supply.—Sealed 11th January—6 months for inrolment.

To William Southam, of Ditchford Mills, in the parish of Irchester, in the county of Nottingham, miller, for his invention of an improved apparatus or machine for drying corn and other grains and seeds.—Sealed 11th January—6 months for inrolment.

To Charles Watt, of Manchester, in the county of Lancaster, lecturer on chemistry, and Thomas Rainforth Tebbutt, of the same place, merchant, for their invention of certain improvements in the manufacture of the hydrate and carbonate of soda from the chloride of sodium, applicable to the making of soap, glass, and other useful purposes.—Sealed 11th January—6 months for inrolment.

To Richard Blight, of Bruton-street, Berkeley-square, in the county of Middlesex, lamp manufacturer, for his invention of a new or improved apparatus or contrivance for effecting the more complete combustion of candles, and superseding the necessity of snuffing.—Sealed 13th January, 6 months for inrolment.

To Edward Davy, of Fordton, near Crediton, in the county of Devon, merchant, for his invention of improvements in saddles and harness for horses, and in

seats for carriages.—Sealed 13th January—6 months for inrolment.

To Charles Barnard, of the city of Norwich, in the county of Norfolk, ironmonger, for his invention of an improved mangle.—Sealed 13th January—6 months for inrolment.

To George Chapman, of Whitley, in the county of York, engineer, for his invention of certain improvements in steam-engines.—Sealed 13th January—6 months for inrolment.

To Henry Hewitt, of Stockwell-common, in the county of Surrey, gentleman, for his invention of a new or improved chemical compound or medicine to be used in the form of pills, for the cure or amelioration of sciatica, rheumatism, and gout, lumbago, ague, and other diseases of a similar nature.—Sealed 18th January—6 months for inrolment.

To Julian Augustus Tarner, of Henry-street, Liverpool, in the county of Lancaster, architect, for his invention of an improved method of propelling vessels through water.—Sealed 18th January—6 months for inrolment.

To Luke Barton, of Arnold, in the county of Nottingham, frame-smith, for his invention of certain improvements in machinery for framework-knitting.—Sealed 20th January—6 months for inrolment.

To Frederick Oldfield Ward, of Camberwell, in the county of Surrey, medical student, for his invention of an improvement or improvements in clothes and other brushes.—Sealed 20th January—6 months for inrolment.

To Ambroise Ador, of Leicester-square, in the county

of Middlesex, chemist, for his invention of certain improvements in producing or obtaining motive power.—Sealed 20th January—6 months for inrolment.

To Herbert George James, of Lower Thames-street, in the city of London, wine-merchant, for an improvement in making bread, being a communication from a foreigner residing abroad.—Sealed 23d January—6 months for inrolment.

To Thomas Hancock, of Goswell-mews, in the county of Middlesex, patent waterproof cloth manufacturer, for his invention of improvements in the method of manufacturing or preparing caoutchouc, either alone or in combination with other substances.—Sealed 23d January—6 months for inrolment.

To Robert Garton, of Beverley, in the county of York, millwright, for his invention of improvements in presses.—Sealed 25th January—6 months for inrolment.

To Francis Charles Parry, of Brompton, in the county of Middlesex, Esq., and Charles de Laveleye, of King's Head-court, in the city of London, engineer, for improvements in the manufacture of bricks, being a communication from a foreigner residing abroad.—Sealed 25th January—6 months for inrolment.

To Charles Hancock, of Grosvenor-place, Hyde-park, in the county of Middlesex, animal painter, for his invention of certain improved means of producing figured surfaces, sunk and in relief, and of printing therefrom; and also of moulding, stamping, and embossing.—Sealed 25th January—6 months for inrolment.

CELESTIAL PHENOMENA, FOR FEBRUARY, 1838.

D.	H.	M.	
1			Clock before the sun, 13m. 55s.
	—		☽ rises 10h. 13m. M.
	—		☽ passes mer. 5h. 52m. A.
	—		☽ sets 0h. 26m. M.
	5	34	☽ in □ or first quarter.
2	17	29	♃'s first satt. will im.
4	11	57	♃'s first satt. will im.
5			Clock before the sun, 14m. 20s.
	—		☽ rises 0h. 17m. A.
	—		☽ passes mer. 9h. 24m. A.
	—		☽ sets 5h. 36m. M.
	11	8	♃'s third satt. will im.
7	18	22	♃'s second satt. will im.
9	1	52	Ecliptic oppo. or ○ full moon.
	13	26	☿ stationary.
10			Clock before the sun, 14m. 33s.
	—		☾ rises 6h. 4m. A.
	—		☾ passes mer. 0h. 39m. M.
	—		☾ sets 8h. 8m. M.
	19		☾ in Apogee.
11	5	54	♃ in conj. with the ☽ diff. of dec. 1. 5. S.
	6	0	♀ in Perihelion.
	13	51	♃'s first satt. will im.
12	11	15	☿ greatest elong. 26. 10. W.
	15	6	♃'s fourth satt. will im.
13	8	19	♃'s third satt. will im.
	8	9	♃'s first satt. will im.
14	17	24	☿ in descending node.
15			Clock before the sun, 14m. 27s.
	—		☾ rises 11h. 59m. A.
	—		☾ passes mer. 3h. 59m. M.
	—		☾ sets 9h. 0m. M.
17	1	51	♄ in □ with the sun.
	5	39	☾ in □ or last quarter.
	7	49	♄ in conj. with the ☽ diff. of dec. 6. 0. N.
18			Mer. R. A. 20h. 25m. dec. 19. 47. S.
	—		Ven. R. A. 23h. 17m. dec. 3. 20. N.

D.	H.	M.	
18			Mars R. A. 22h. 12m. dec. 12. 13. S.
	—		Vesta R. A. 0h. 44m. dec. 1. 13. S.
	—		Juno R. A. 17h. 38m. dec. 11. 38. S.
	—		Pallas R. A. 2h. 36m. dec. 13. 9. S.
	—		Ceres R. A. 4h. 41m. dec. 25. 8. N.
	—		Jupiter R. A. 11h. 9m. dec. 6. 58. N.
	—		Saturn R. A. 15h. 47m. dec. 17. 45. S.
	—		Georg. R. A. 22h. 39m. dec. 9. 16. S.
	—		Mercury passes mer. 22h. 34m.
	—		Venus passes mer. 1h. 25m.
	—		Mars passes mer. 0h. 20m.
	—		Jupiter passes mer. 13h. 15m.
	—		Saturn passes mer. 17h. 52m.
	10	16	♃'s second satt. will im.
	15	45	♃'s first satt. will im.
20	10	26	♂ in Perihelion.
	—		Clock before the sun, 14m. 3s.
	—		☾ rises 5h. 6m. M.
	—		☾ passes mer. 8h. 18m. M.
	—		☾ sets 11h. 30m. M.
	10	13	♃'s first satt. will im.
22	5	6	♀ in conj. with ☽ diff. of dec. 3. 48. N.
23	17	43	♂ in conj. with the sun.
24	0	8	Ecliptic conj. or ● new moon.
	1	0	☽ in Perigee.
	20	48	☿ in Aphelion.
25	—		Clock before the sun, 13m. 22s.
	—		☽ rises 7h. 38m. M.
	—		☽ passes mer. 1h. 12m. A.
	—		☽ sets 7h. 3m. M.
	17	38	♃'s first satt. will im.
26	23	22	♅ in conj. with the sun.
27	12	7	♃'s first satt. will im.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR DECEMBER, 1837, AND JANUARY, 1838.

1837.	Thermo.		Barometer		Rain in inches.	1838.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low.	High.	Low.			Hig.	Low	High.	Low.	
Dec.						Jan.					
26	50	34	29,87	29,80		10	27	17	29,98	29,87	
27	47	39	29,76	29,73		11	27	55	30,04	29,87	
28	51	43	29,83	29,77		12	23	45	30,25	30,17	
29	51	41	29,80	29,77		13	26	13	30,21	30,11	
30	53	43	29,89	29,85		14	27	6	29,95	29,83	
31	49	40	29,92	29,89	,0125	*15	23	1	29,74	29,73	
Jan. 1838.						16	31	9	29,95	29,74	
1	49	35	29,90	29,86		17	33	16,5	30,11	30,07	
2	49	32	29,84	29,68	,025	18	25	15,5	30,08	29,84	
3	46	34	29,72	29,55		19	21	8	29,74	29,72	
4	45	24	29,99	29,84	,05	*20	19	—5	29,88	29,81	
5	33	24	30,18	30,13		21	33	5	29,85	29,68	
6	38	24	30,18	30,17		22	42	29	29,68	29,62	
7	36	28	30,22	30,17		23	37	24	29,68	29,64	
8	31	23	30,28	30,19		24	27	19	29,68	29,64	
9	26	17	30,17	30,08		25	29	19,5	29,54	29,42	

* The very low state of the thermometer has not been equalled during the past eighteen years; upon reference to our Journal for January 1820, we find two remarkable coincidences, viz. that during the previous days of the week, the wind had been, as now, from the N.E., changing on the morning of the 15th to the S.W., and the thermometer falling to 1°, it is singular enough that just the same date of the present year marks the same low degree of temperature, and precisely the same change of the wind.

The still lower state of the thermometer on the morning of the 20th, when it was 5° below Zero, or 37° below the freezing point, has not been equalled since the 25th December, 1796, when it was one degree and a half lower, viz. *six degrees and a half below Zero*, which we believe to be the lowest degree ever registered in Great Britain.

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

THE

London

JOURNAL AND REPERTORY

OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. LXXII.

Recent Patents.

To AUGUSTUS APPLEGATH, *of Crayford, in the county of Kent, calico printer, for his invention of certain improvements in printing calico and other fabrics.*— [Sealed 15th November, 1836.]

PLATE XIV., fig. 1, represents in elevation the wheel side of a machine for printing six colours; fig. 2, is the opposite side of the machine; fig. 3, is an end elevation of the same; and fig. 4, a horizontal view of the upper parts. The same letters refer to similar parts in all the figures: A, A, is the cast iron frame; B, B, the moveable frames or heads to which the block tables C, C, are attached by means of hinges, which permit the block tables to be turned over when the blocks require brushing &c.; D, D, are the blocks which are cut, cast, coppered, pinned, or engraved in the usual manner; they are fixed to the block tables by means of screws

or T-headed holders, as further explained in the diagrams. Figs. 5, 6, 7, and 8; E, is the impression tables, which is made of cast iron or stone, and which should be flat, solid, and heavy, in order to receive the blow or impression. At each end of the impression table is a roller, which serves to guide the cloth to and from the impression table; F, F, are the rubber carriages, which support the rubbers G, G, in the notches; the under surface of the rubber carriages is made with inclined planes, so that when the carriages advance, they lift the rubbers one quarter of an inch; H, H, are the hammers or mauls which give the impressing blow to the block tables C, C.

The hammers are fixed to the wrought iron shafts I, I, by means of the sockets and binding screws, which permit them to be adjusted, so as to strike the block tables simultaneously: K, the feeding drum, which advances the printing cloth and the material to be printed, and the periphery should contain or be divisible into any certain number of spaces, each equal to the set of the blocks or the quantity of cloth which each block prints at one impression in this machine; it contains fifteen spaces of three inches each, which is the set of the pattern here shown.

The feeding drum is furnished with a wheel L, having ninety teeth of half-inch pitch, and it has also fifteen stop pins accurately pitched, which regulate and govern the advance or feeding in of the correctness of the cloth and the material to be printed, and upon which the joining of the pattern depends; M, is a double pinion or two pinions fixed upon the same axis; the small pinion has twenty-four teeth, and is always in the gear with the wheel L; the large pinion has forty-eight teeth, and is

furnished with four arms; it is occasionally driven by the toothed segment N, which is furnished with a curved wiper, which acts against the arms of the large pinion M; O, is a segment within the frame A, which occasionally comes in contact with the small wheel or roller P. The segment O, and the roller P, are made of wood, and are covered with coarse cloth, so as to produce motion by the pressure of their surfaces against each other without teeth. Upon the spindle of P, two band pulleys are fixed, which occasionally give a backward and forward motion to the rubber carriages F, F, by means of their catgut bands; Q, is another wheel or roller clothed as P, against which the cloth segment O, acts as soon as it has left P. Upon the axis of the roller Q, is a band pulley which carries a cross band to another pulley fixed upon the spindle P, whereby the motion of the spindle of P, and its band pulleys is reversed, and the rubber carriages are drawn back; R, R, are small grooved pulleys which guide the catgut bands; S, is a roller which binds or confines the printing cloth to the feeding drum K; T, is a similar roller, which binds the oil skin and material to be printed in like manner to the feeding drum K, so that they are conveyed by the feeding drum without any drag or stopper; V, is a pall which acts against the division pins of the feeding drum wheel L. The printing cloth or blanket is made endless, and passes from the feeding drum across the impression table and over the roller at the leaving end of the impression table, turning under the impression table to the roller S, and the drum L.

The oil skin upon which I prefer to print is also made endless, and passes over the roller T, to the feeding drum, then over the roller at the entering end of the impression table, across the table over the roller at the

leaving end of the table, and away from the machine, in the manner shown in the diagram, fig. 9. The cloth, silk, or material, to be printed, is first supplied from a roller in the usual manner. The cloth, &c., is conveyed to the impression table in the following manner:—The toothed segment N, and the pinions M, move one quarter of their circumference, which causes the feeding drum to advance as much as is equal to one set or impression of the pattern cut upon the blocks, and a little more so, that the division pin may pass the end of the pall V, just so much as to admit it to fall behind the pin, when the elasticity of the cloth, &c. will draw the drum and wheel a little back, until the pall stops the pin, and holds the drum and the materials upon it firm and steady during the impression; W, W, are wrought iron bars moving up and down in guides; they are connected with the moveable heads B, B, and are furnished with friction pulleys V, V, against which the cams act, and occasionally raise and depress the heads B, B, and the blocks; their brass guides are seen in fig. 1; X, X, are the depressing cams or shapes; Y, Y, are the lifting cams, they are fixed on the spindles of the wheels; Z, Z, are counter weights and their levers, they serve to counterpoise the bars W, W, and the heads B, B, and thus steady and soften the up-and-down motion.

The wheels *q, q, q,* are in gear with each other, and have seventy-two teeth of one inch pitch, which occasionally depress the pulleys and levers *b, b,* which are connected with the rods *c, c,* the upper ends of which are made to loop over and embrace the arms *d, d,* of the hammer shafts I, I, when the full part of the cams *a, a,* depress the levers *b, b*; the rods *c, c,* draw the arms *d, d,* in a downward direction, and raise the hammers to the position shown in fig. 1; and they are detained

in this position by means of the hooked levers *e*, *e*, which move on the pins *f*, *f*. On the cams *a*, *a*, are detached pins *g*, *g*, which occasionally raise the lower ends of the levers *e*, *e*, and cause them to let go the arms *d*, *d*, of the hammer shafts I, I, when the hammers fall by their own gravity, and give the impressing blow upon the block tables *c*, *c*, *c*. The force of the hammers may be increased by circular weights, having a central hole to fit on the head of the hammer; one of such weights is seen in fig. 1: *h*, *h*, are counter weights, which overbalance the rods *c*, *c*, and the levers *b*, *b*, and thus keep the looped end of the rods clear of the arms *d*, *d*, when they rise on the fall of the hammers.

The blocks are supplied with colour in the following manner:—*i*, *i*, is the sieve frame containing the sieves or colour surfaces *j*, *j*, they are made of water proof cloth, or any suitable material that will not suffer the colour to pass through; *k*, *k*, *k*, are brushes to spread or distribute the colour, called teering brushes, they are attached to the cross bar *l*, which is furnished with a small friction roller *m*, against which the inclined planes *n*, *n*, act as the sieve frame advances, and by which means the brushes can be lifted clear of the ends of the sieves and sieve frame, and the length of their contact with the sieves determined.

To assist the action of the teering brushes, a cross bar of wood or iron padded with a blanket, and covered with a piece of oil silk, may be fixed under the sieves to the side bars upon which the sieve frame slides, which will bear the sieves up as they slide between the cross pad and the brushes, and better enable the brushes to teer out and obliterate the impression of the blocks upon the sieves. This pad is indicated by dotted lines in figs. 3, and 4; o, is a catgut band pulley

which revolves upon an axis fixed to the frame, and motion is occasionally given to it by the clothed segments *p*, and *p*, *x*, which are fixed to wheels *q*, *b*, by acting against the clothed wheel *r*, which is fixed upon the axis of *o*, which is furnished with two arms *s*, and *s*, *x*, against which the pins *t*, and *t*,* of the clothed segment act, and thus ensure the starting of the band pulley and the sieves at the proper times. The action of the machine is as follows:—

The cam Y, having raised the moveable heads B, B, and the blocks from the impression table, as *shown in* fig. 1, the segment *p*, is shown with its starting pin in contact with the arm *s*, of the wheel *r*, of the band pulley *o*, which, as it moves, will draw the sieve frame *i*, *i*, and its sieves under the blocks with the coloured surface of the sieves, about one inch below the engraved surface of the blocks.

The cams X, X, will then in their progress press against the lower friction pulleys of the rods W, W, and depress them and the heads B, B, with the block tables and blocks nearly one inch, so as to bring the engraved surfaces of the blocks slightly into contact with the colour upon the sieves, but by no means to press upon the sieves themselves; the segment O, will then come in contact with the small friction wheel P, and cause it to revolve with its band pulleys, which will, by means of their catgut bands, draw the rubber carriages F, F, forward, in the direction of the arrow, seen in fig. 1; the under sides of the rubber carriages are furnished with small inclined planes, which, as they advance, raise them upwards, and cause the elastic surfaces of the rubbers gently to press against the under side of the sieves, and thus as the rubbers move, they complete the contact of the coloured sieves with

the engraved blocks, whereby a proper portion of colour is transferred from one to the other. The action of the machine continuing, the segment O, will next act against the small wheel Q, which, by means of its cross band, will reverse the motion of the wheel P, and cause its band pulleys to draw the rubber carriages back into their former position; the segment *p*,* will then act against the arm *s*,* of the wheel *r*, and thus cause the band pulley *o*, to draw the sieve frame back to its former position, as seen in figs 3. and 4. The detaching pins will then disengage the hooked levers from the arms on the hammer shafts, and the blow or impression will take place, and thus each block will print cloth equal to its own size or set, at one revolution of the wheels *q*, *q*. The full part of the depressing cams X, X, having previously caused the heads B, B, and the blocks to descend upon the material in the impression table.

Fig. 5, represents the back of a printing block with three iron strength plates let into the wood, which have gaps in them to receive the I, holding screws and nuts, which are seen in fig. 6, fixing the block D, to the block table C; figs. 6 and 7, show a convenient method of connecting the block tables C, with the moveable heads B, B, before described; *a*, *a*, are flat plates of wrought iron, one-eighth of an inch thick, which are firmly screwed to the ends of the block tables; *b*, *b*, are pins rivetted into the hinges *c*, *c*, and screwed to fit the thumb nuts *d*, *d*; the holes in the plates *a*, *a*, are larger than the pins *b*, *b*, to admit a little motion for adjusting the blocks. The hinges *c*, *c*, are firmly fixed at one end to the moveable heads by the screws *e*, *e*, at the other end, they are held by the thumb screws *f*, *f*.

Fig. 8, is a diagram of the moveable heads and block tables, with one of the tables reversed, in order to bring

the face of the block in view; one set of the hammers is thrown back out of the way, which is done by partly unscrewing the binding screw in the socket of the arm *d*, which then permits the hammer shaft to be moved round.

Fig. 9, is a diagram, in which, instead of a rubber, as before described, a roller is used to make the contact between the sieve or colour surface and the block; B, is part of the moveable head; C, the block table; *i, i*, part of the sieve frame; and D, is the block, which is retained near the colour surface, but not in contact *with it*; R, is the roller, which may be made of wood or of brass tube, and is covered with the elastic composition made of treacle and glue, commonly used in letter-press printing machines, and it is then covered with waterproof cloth. The roller revolves freely upon its axis, and may be made to press up against the sieve by counter weights or springs. The contact of the colour surface and block takes place only where the roller raises the sieve as it passes backward and forward; and this modification of the colouring apparatus I prefer, when the blocks are very finely cut or coppered. A slight degree of elasticity is required in the sieve, which may be given either by lacing the sieve to the sieve frame with India rubber bobbin, or by attaching it with fine spiral springs, or by any other convenient method.

Fig. 10, shows a rubber detached from the machine before described; it consists of a cast iron trough, holding a flexible or yielding waterproof tube, nearly filled with water, or any other fluid that will not permeate the tube, and securely closed at either end, so as perfectly to retain the enclosed fluid. The tube can be securely retained in its position in the trough by enclosing both in a covering of thin linen cloth sewed together; and the

firmness of its action or touch against the sieve can be easily regulated by tying the ends more or less, so as either to increase or diminish its capacity and consequent resistance, without either removing or injecting more fluid. But I do not limit myself to either this or any other kind of rubber or roller, or to a brush or a pad, for making the contact between the colour surface and the block in the manner here shown, but I claim the right to do so by any suitable implement or contrivance.

In figs. 1, 2, 3, and 4, the colours are supposed to be supplied by two boys, one standing on each side of the sieve frame, as the teering brushes, which are attached to the bar *l*, only spread or distribute the colour, but do not supply it.

Fig. 11, shows a method by which the teering brushes may themselves supply the colour to the sieves: B, is the moveable head and its block; *i*, *i*, is the sieve frame. When the sieve frame has run in under the blocks to supply them with colour, the bar *l*, and its teering brushes may be lowered down by means of its friction pulley *m*, and the inclined plane *z*, into contact with the rollers *s*, *s*, in the colour boxes *t*, *t*: the quantity of colour on the roller *s*, can be regulated by the padded straight edge *r*, which may be adjusted and held by the screws *x*, *x*; and the colour rollers should have a very slow motion around their axis to renew the colour taken from it by the teering brushes. In this case, the pad beneath the teering brushes may be removed, and a double set of brushes, as shown in the drawing, may be used, if required.

Fig. 12, is a side view of an apparatus for applying the colour to a hand block, such as used by a block printer; fig. 13, is an end view of the same; fig. 14, is a plan thereof, the same letters refer to the similar parts

in each figure: A, is the cast iron frame; B, the block; C, the sieve or colour surface; D, the teering brush, which is fixed to the cross bar E, which serves also to connect the side standards F, F, the under sides of which are furnished with projections which enter into the side passage Z, made between the frame and the top bar G, G; the side standards F, F, are further connected by a stretcher bar or rod; H, is the colour trough; I, the roller, the colour on which is regulated by the padded straight edge K; L, is a padded board, which also moves freely in the slide passage Z, and serves to support the sieve when the brushes pass over it; M, is the contact rubber, made as described in fig. 10, and it also moves or slides freely in the passage Z; N, N, are small grooved pulleys, which guide the catgut bands; O, is a segment covered with cloth, and fixed upon the spindle P; as it revolves it moves the clothed wheel Q, and causes it and its spindle, and the fly pulleys R, R, fixed upon the spindle, to revolve, when it draws the standards F, F, and the cross bar E, with its teering brush, along the sieve, in the direction of the slide passage Z, and thus imparts the colour to the surface of the sieve, the block being then used by the printer in impressing the material. As the standards advance, their projections, which slide in the passage Z, come in contact with the ends of the pad L, and push it along the slide, the teering brushes being then in contact with the upper surface of the sieve, and the pad, which is directly beneath them, in contact with the under surface of the sieve; and thus the sieve receives its colour, and the mark or impression made by the pattern of the block is effectually obliterated or "*teered out.*"

When the segment O, has left the roller Q, it acts against the reversing roller S, which is fixed to its spin-

dle, as is also a small fly pulley T, which carries a catgut band to V, which is a similar pulley upon the spindle of R, and thus the motion of the fly pulley R, becomes reversed, which returns the standards F, F, and the teering brushes, back to their situation over the colour roller. The pad L, is also drawn back by the standards E, E, by means of the spring catches or hooks *a*, which move upon pins *p*, fixed to the standards; and they act upon the small projecting studs *b*, *b*, at the ends of the pad, and thus hold it during the return motion until the pad is stopped by the stop pins *c*, *c*, fixed to the frame, when the spring catches rise up the bevil edge of the stud *b*, and leave the pad in its first situation, as shown in fig. 12.

In order that the spring catches may not, during the advance, strike the pad studs *b*, and push the pad before it, the catgut bands which draw the standards are attached to eyes fixed in the catches, which raise their ends over the studs *b*, *b*, so that the pad is only acted upon by the spring catches during the return. The spring catch is shown by the side of fig. 12, on an enlarged scale: W, is also a clothed roller, having upon its spindle a fly pulley, which carries a crossed band to a similar fly pulley upon the spindle of X, which draws the contact rubber M, backward and forward in the same manner as the standards just described; the rubber having less distance to travel than the brushes, its fly pulleys X, X, may be proportionably smaller.

In connecting this colouring machine with the driving power, it would be convenient so to arrange it, that the printer may stop and start it as he requires, by placing his foot upon a treadle or treadles connected with the clutch or driving pulleys.

Fig. 15, shows an arrangement of the sieves in which

they enter sideways under the blocks: B, is the moveable head; C, C, are the block tables; D, D, are the blocks, as before described; *i*, *i*, the sieve frames, which move towards each other until they meet in the centre between the blocks, when the colour is applied to the block in the manner before described, and the backward and forward motion of the sieve frame may also be produced by segments and band pulleys. The feeding in of the cloth, and the mode of giving the impression, is likewise made in the same manner as hereinbefore explained. In this form of machine, and in that described in figs. 1, and 2, the material to be printed is supplied to the feeding drum from a roller having a quantity of material around it, in the ordinary manner of copper plate presses and cylinder machines; and after the material has left the machine printed, it is carried away by the common methods, over and under guide rollers, the position of which, as well as of the course of the material, must depend upon the situation where the machine is worked or placed. The course of the printing cloth or impression blanket is shown in figs. 1, and 2, by a red line; and it is to be observed, that when an endless oil silk is used to print upon, the superfluous colour which has passed through the material in printing it must be wiped off, and the oil silk dried by rubbing it with a dry cloth, before it returns to the machine.

It is to be observed, that I do not hereby claim any of the separate parts of the said described improvements or machines which have been made, or which have been in use before; but that I claim their combinations for the uses here shown, not limiting myself to the precise form of carrying the said uses or improvements into effect, but claiming the right to employ any suitable material or form for that purpose; and, especially, I

claim that improvement which relates to applying the colour to the blocks, in any and every combination to which it may be applied.—[*Inrolled in the Inrolment Office, May,* 1837.]

Specification drawn by the Patentee.

To HENRY HUNTLEY MOHUN, *of Walworth, in the county of Surrey, doctor in medicine, for his invention of improvements in the manufacture of fuel.*—[Sealed 4th October, 1836.]

THIS invention consists in combining certain materials whereby the Patentee is enabled to produce a cheap and highly useful fuel. The materials employed are—first, peat-earth, peat-moss, peat-turf, slimy or other mud or marl, or any other earth which is composed largely of vegetable matter; secondly, nitre; thirdly, alum; fourthly, linseed or other seeds, or shelled fruit; fifthly, rosin; sixthly, coke; seventhly, any green vegetable matter; and, eighthly, animal excrement or other animal matter.

The following is the process of combining and pressing the materials into lumps, for fuel:—Take one ton of peat in its raw or charred state, thirty pounds of nitre (the crude nitre does best), fourteen pounds of alum, which has the effect, when properly dissolved and thoroughly amalgamated with the rest, to prevent smoke; fourteen pounds of linseed, fourteen pounds of rosin, or asphaltum, or naptha; one hundred and fifty pounds of coke; one hundred and sixty-eight pounds of green vegetable matter; one hundred and fifty-six pounds of animal excrements or other animal matter. The quantity of the

various materials will depend on the quality of the peat-earth, peat-turf, peat-moss, slimy or other mud, marl, or any other earth which is composed largely of vegetable matter, the above quantities being given for peat of the best quality; and in order to determine the relative qualities for any particular earth, it will be necessary to weigh out varying quantities, and having mixed, pressed, and dried them, to burn the same, in order to ascertain which mixture produces the description of fire desired.

The process of mixing may be thus proceeded with for large quantities:—The peat is first to be passed through the mixing mill in a dry state; and the mill employed is an ordinary pug mill, such as is used in brick-making. About one-third or half of the linseed is to be boiled in water, in order to produce a liquid about the consistency of thin glue; in this the alum is to be dissolved: the remainder of the linseed, with the rosin and nitre, are to be crushed very fine by edge stones or other means; and the green vegetable matter is also to be ground or crushed in like manner, and thus produce a pulp, taking care to keep the vegetable juices from running away.

The whole of the materials are then to be mixed with spades, or otherwise, and well ground in the pug mill; the object being to obtain an intimate blending of the various materials in order to the same burning equally.

The combined mass so produced is then to be pressed into moulds by a strong screw or other press, the shape and dimensions of the lumps not being material; but it is desirable the materials should be well pressed in order to prevent the lumps readily coming to pieces; if not pressed, the fuel will be apt to crumble and burn too fast if exposed to a strong draft.

The Patentee says, "I claim the combination whether the same be submitted to pressure or not, the advantage of pressing being to increase the time it takes consuming."

The lumps thus produced are to be piled one on the other, leaving spaces between for the circulation of the atmosphere; and it will facilitate the preparation to have such piles in a closed shed or room, the atmosphere of which can be heated; though in summer time, and warm dry weather, this will not be necessary, unless great expedition is required. Care must be taken not to expose it to a great artificial heat when just formed or pressed. It must be dried by the atmosphere only, for the first two or three days.

The peat, it should be observed, may be first used for the purposes of distilling gas therefrom, as has been before practised, and the charred peat in the retorts subsequently used for the making of the fuel, in place of the raw peat, as above described.

In order to make the new fuel for the purpose of obtaining gas therefrom for illuminating purposes, take in the proportions of ten pounds of nitre, forty pounds of rosin, twenty-four pounds of linseed, one hundred weight of green vegetable matter, and one ton of peat, which being combined and treated according to the directions above given, and the lumps put into ordinary gas retorts and distilled similarly to ordinary coal.

Having thus described the nature of the invention, and the manner of combining the same, the Patentee says, "I would remark, that I do not confine myself to the precise three processes here described, for it will be evident that the object to be obtained is a careful combining or mixing of the materials herein mentioned, and the subsequent pressing the same into hard lumps

of convenient size; and, whether such processes are conducted as above described, or by any other convenient means, it does not alter the nature of the invention; and, I would remark, that I do not claim the application of each of the eight parts or materials separately as a fuel, whether pressed or unpressed, some of them, such as the peat-earths or peat-turf, peat-moss and coke, and some others, having been used for fuel before. The green vegetable matter is most useful as soon as possible after cutting, and when the vegetable juices are not dried up. And, lastly, I do not confine myself to the using the whole, or even the larger number of the eight matters above-mentioned into one fuel, though I believe the same to be the best compound. But what I claim, is the combining and pressing such materials into fuel, as above described."—[*Inrolled in the Inrolment Office, April,* 1837.]

To GEORGE CRANE, *of Yniscedwyn Iron Works, near Swansea, iron-master, for his invention of an improvement in the manufacture of iron.*—[Sealed 28th September, 1836.]

ACCORDING to the ordinary practice of obtaining iron from iron-stone mine, or ore, in this country, the iron-stone mine, or ore, either calcined, or in the raw state, according to its respective qualities, is put into suitable furnaces, with coke produced from bituminous coal, formerly called pit-coal, in contradistinction to charcoal produced from wood, which was the fuel employed in this country previously to the introduction of pit-coal, in the smelting and manufacture of iron. Now,

as there are districts in which are to be found large quantities of iron-stone mine, or ore, in the immediate neighbourhood of what is known as stone coal, or anthracite coal, it has been long considered as a desirable object to employ such coal for the smelting and manufacture of iron; and although attempts have been made to apply such description of coal in the smelting and manufacture of iron, those attempts have failed, and have, consequently, been abandoned.

In addition to the advantages to be obtained from using anthracite or stone-coal in the districts where such coal is found, together with iron-stone mine, or ore, the practice of the Patentee has induced him to believe that such coal, from its properties, will be found to produce a quality of iron nearly resembling iron obtained by the aid of vegetable charcoal.

Now, the object of this invention, is the application of such anthracite or stone-coal, combined with a hot-air blast, in the smelting or manufacture of iron from iron-stone mine or ore. And, in order to give the best information in his power for enabling a workman to carry out such invention into effect, he describes the process or means pursued in the following way:—

"I will suppose the furnace of an ordinary construction to be in blast, and that the machinery and apparatus are adapted for the application of a hot-air blast, as is well understood, and extensively applied in many places where the ordinary fuel (coke or bituminous coal, or the coal in a raw state) is employed in the manufacture of iron from-iron stone mine or ore; and I have found that a furnace, having suitable apparatus for heating the blast to about six hundred degrees of Fahrenheit, a good arrangement for carrying out my invention;

though so high a degree of temperature is not indispensably necessary, but, I believe, preferable.

"In charging such a furnace, I throw in about three hundred weight of anthracite or stone-coal, or culm, to each five hundred weight of calcined argillaceous iron-stone, with a proper quantity of flux, as if working with the coke of bituminous coal; such charging of the furnace, and the general working, with the exception of the using of anthracite or stone-coal, is to be pursued as if working with coke of bituminous coal; and I would remark, that the quantities above given are such as I have hitherto employed in making the best qualities of pig-iron, viz. No. 1, and No. 2, at my works, from the anthracite, stone-coal, or culm, found in the neighbourhood of Yniscedwyn iron-works; but those quantities may be varied according to local circumstances, and the refractory nature of the iron-stone mine, or ore, or otherwise, to be reduced, and the quality of iron desired to be obtained, as is the case in ordinary working, and at the judgment and discretion of the manager, as heretofore; and I would remark, that the anthracite or stone-coal, or culm, may be coked in like manner to bituminous coal before charging the furnace; but from my experience, I have not (so far as my practice goes in working with the coal obtained in my neighbourhood) found that such coking is necessary, or that a more advantageous result is obtained than in applying the anthracite or stone-coal directly from the mine.

"And it is desirable to observe, I have found it of advantage that the blast of hot-air should be as free and unimpeded as possible; and from that cause I have hitherto used only anthracite or stone-coal, the smaller parts of which would not pass through a sieve of an inch

mesh; but where the pillar or blast of air is considerable, say two pounds and upwards on the square inch, this precaution is not necessary.

"Having thus described the nature of my invention, and the manner of carrying the same into effect, I would have it understood that I do not claim the using of a hot-air blast separately in the smelting and manufacture of iron as of my invention when uncombined with the application of anthracite or stone-coal, and culm; nor do I claim the application of anthracite or stone-coal in the manufacture or smelting of iron when uncombined with the using of hot-air blast. But what I do claim as my invention, is the application of anthracite or stone-coal, and culm, combined with the using of hot-air blast in the smelting and manufacture of iron from iron-stone mine, or ore, as above described.—[*Inrolled in the Inrolment Office, March*, 1837.]

To MICHAEL LINNING, *of Hill-street, in the city of Edinburgh, in North Britain, clerk to the Signet in Scotland, for his invention of a certain improved method of operating, for the purpose of converting peat-moss and peat-turf, or bog, into fuel, and obtaining from it tar, gas, and other certain substances or matters.*—[Sealed 6th February, 1837.]

THE Patentee says, that he first reduces the mosses to a homogeneous pulpy mass, nearly in the same manner as brickmakers reduce their plastic material to a uniform state, namely, by passing it through what they call a pug-mill, but which is fitted with longer and sharper knives, somewhat obliqued; or the same object may be effected by means of the vertical rollers also used by

brickmakers and by colour-grinders, or by any other grinding or crushing apparatus, whereby the moss is subjected to the process of cutting, milling, kneading, or pressing, whereupon it presents or exhibits a smooth, oily, or glutinous appearance on the surface.

The moss so prepared, is then carried to and placed upon a table, platform, or floor, to be cut or moulded like bricks into any size or shape, either by the hand or by mechanical means; or if desirable, and for particular purposes, coke prepared from the moss itself may be mixed and incorporated with the moss pulp before the same is cut or moulded into blocks.

These blocks or pieces are then to be exposed or subjected to more or less pressure by means of levers, screws, hydraulic presses, or other compressing power or apparatus, and transferred to and arranged in a close chamber, heated by flues or a stove, or to a kiln, in order that they may dry or consolidate from the evaporation of the moisture they contain.

Exposure in this manner to an artificial heat, produced by, or obtained from, the substance itself, and raised from 70 to 120°, or higher, for a period of twenty-four hours, will probably be sufficient to dry the manufactured article completely; as will be easily discernible, and which is obtained in a very hard and dense state, and may be used for the same purposes as pit coal, with the advantage that it is free, at least generally so, from sulphur.

In the spring, summer, and autumnal months, this fuel may be dried in sheds and tents, in frames either of wood or iron-wire in the open air; such frames having a tent or canopy roof so constructed as completely to throw off the rain and protect the fuel in the shelves underneath from the rain and from nocturnal

dews and frosts; and for the better preservation of such frames, they are proposed to be painted with the tar extracted from the fuel in the process of coking.

The Patentee states that he also obtains residuary matters from furnaces, fire-places, and stove flues, in which the above fuel is burnt, which, after being ground either in water or oil, and freed from all impurities, may advantageously be employed as colouring matters, and as substitutes for ivory black and for Roman ochre or English umber, and other similar pigments.

Coke is likewise to be prepared from the same fuel in coking kilns, similar in construction to those used for coking coal, but in which the draft is smaller, and the access of external air still more restricted, or in retorts; and in making this coke, tar is also produced, which may be used as a substitute for foreign tar in smearing ships; for making pitch and other purposes by heating the fuel in a close vessel or retort, or proper distillatory apparatus, such as is well known to chemists and persons conversant in these matters.

Gas, ammonia, oil, and materials from which candles may be made, and which may be used as a varnish, are produced, besides the coke and tar, by the admixture of this fuel either in a high-dried state, or in its coke with its own tar.

The Patentee further states, that he also obtains a totally new and different modification of the material, which will be found a powerful and fertile generative of steam or gas, giving out an intense heat and bright flame, for the immediate and economical supply of his fires and furnaces for his stoves, kilns, and retorts, either by an expeditiously and simply applied compression and evaporation, or both in ovens or on hearths, by means of which he reduces the substance directly as

it comes either from the moss field or the mill, into a fuel sufficiently adapted for the above temporary and subservient purposes, namely, of feeding his fires and furnaces.

In conclusion, the Patentee says, "Having now described my invention in such a manner as to enable competent persons to practise the same, I will point out what I claim as my said invention. And whereas the different mechanical and other apparatus, such as mills and presses, kilns and stoves, which I have described or referred to, in describing how to convert peat-moss, peat-turf, or bog, into fuel, according to my improved method, as well as the different processes which I have referred to, of making tar gas for illumination, and ammoniacal gas, are not any of them new in themselves. And, whereas the processes of coking peat prepared for fuel in the ordinary way, and the processes of obtaining gas and other substances from it have been practised, or are or may be known to chemists, I wish it to be clearly understood that I make no claim of invention to the said apparatus or processes as such, nor do I in particular claim generally to have discovered how to obtain from peat the substances, tar, gas, oil, ammonia, varnish, and spirit, obtainable from it. All I claim in my invention, in so far as regards those particular substances, is their application to useful and practical purposes ; but I wish it to be clearly understood that I especially, primarily, and exclusively claim as my invention the particular method of operating, which I have described, and of preparing, working, milling, and drying peat-moss, peat-turf, or bog, so as to produce a great and total change upon its qualities and properties, whereby I am enabled to convert the said peat-moss, peat-turf, or bog, into an highly useful and extremely valuable fuel, assimilating

it in some degree to coal, and rendering it subservient to various public and profitable purposes.

"And I moreover claim as my discovery or invention, that the coke, the residuum of said fuel, may, by being ground either in water or oil, be employed as a pigment, and used as a substitute either for ivory black or blackening, and for several other purposes; and that the ashes obtained from said fuel may, by the simple process of boiling in pure water, and by being freed from all impurities, and by being in like manner ground in water or oil, be employed as a pigment, and used as a substitute either for Roman ochre or English umber.

"The conversion, then, of peat-moss, peat-turf, or bog, into a fuel equal to coal for some, and superior to it for several purposes, by the particular method of operating, which I have described, and the extraction of the two several pigments I have specified, are the inventions and discoveries which I specially claim, and which constitute the foundation principles and elements of the patent which I have obtained, conferring upon me the exclusive right, privilege, and benefit of the same, and under and in virtue of which I claim protection accordingly, in principle and in practice, whatever may be the modes, devices, or means which others may contrive or resort to in order to effectuate the same purposes, and obtain the same or similar results."—[*Inrolled in the Inrolment Office, August,* 1837.]

To Richard Burch, *of Heywood, in the county of Lancaster, mechanist, for his invention of certain improvements in locomotive steam-engines, to be used either upon rail or other roads, which improvements are also applicable to marine and stationary steam-engines.*—[Sealed 16th February, 1837.]

These improvements in locomotive steam-engines, to be used either upon rail or other roads, which improvements are also applicable to marine and stationary engines, consist, firstly, in the peculiar construction of the engine, or in a novel arrangement of its common essential parts, whereby I am enabled to apply a separate cylinder and piston, or direct driving power to each running wheel of the carriage, and communicating the same to the crank pin in the wheel or to the crank on the end of its shaft, without the aid of a connecting rod, and, consequently, coupling the wheels and effectually causing each wheel to revolve at every stroke of the piston, and proceed along the rails or road at each revolution, instead of unnecessarily slipping upon the rails without progression, as ordinary locomotive engines are liable to do.

To effect this, two cylinders are applied upon each side of the framing or carriage of the engine, in a line between the wheel axles or crank centres, and as the cranks revolve, the cylinders oscillate between them, thereby yielding to their motion, and, by a second improvement which I have applied, this vibration of the cylinder opens and closes the steam ports or valves.

The second improvement in the construction of locomotive and other steam-engines, consist in the application of a peculiarly-formed face or disc valve, which is constructed upon the principle of an ordinary venti-

lator, and which I prefer should be divided into four, eight, sixteen, or such other number of equal parts as will divide by four without remainder. One half of these equal parts to be solid faces, and the other half to be openings or steam ports alternately, as will be more fully described hereafter. A horizontal shaft placed across the carriage supports the parts which form these valves, and also carries the four cylinders and forms the centres of oscillation for each pair, and as the cylinders vibrate upon their common centres, the valves or steam boxes being fixed or stationary upon the shaft, it will be evident that the opening and closing of the steam ports is thus effected.

The third feature of novelty in the construction of locomotive or other steam-engines, is the introduction of a plate or disc of metal between the two faces above described, constituting the valve. And this plate being formed with corresponding openings or apertures to those in the valve, by being worked either backwards or forwards by a lever, will instantly reverse the stroke of the engine, and cause a retrograde motion to be performed, that is, by its intervention converting those openings in the valve which were outlets for the steam into inlets, and *vice versâ.*

The fourth improvement is the parallel guides, or the means by which the centres of the cranks upon one side of the engine carriage are always kept square or at right angles to those upon the other side; and this arrangement also totally prevents any lateral strain upon the piston rods. This is effected by the attachment of a slide or parallel groove fixed on to the outer end or cap of each cylinder, and, consequently, allowed to vibrate with it, and in which groove or slide the brasses of the crank pins run or work.

For the more perfect illustration of these improvements, and in order to render their application to locomotive and other steam-engines perfectly understood, see the drawings, in which their application generally to locomotive engines is shown, and also their application partially to stationary and marine engines, all of which separate figures are marked with letters of reference, having corresponding letters upon similar parts.

Plate XV., fig. 1, represents a side elevation of a locomotive engine, constructed upon the principle of the improvement; and fig. 2, is a plan or horizontal view of the same; fig. 3, is a side view of a pair of cylinders, with the valve taken from one side of the carriage, in order to show it detached, and the situation of the steam ports; A, A, is the boiler and furnace of the engine, constructed upon the ordinary principle, being supported by the framing B, B; C, C, C, C, are four steam cylinders, which are bolted by flanges, or otherwise fastened to the steam chamber or valve box D, D. Upon the ends of the shafts of the running wheels, cranks *b*, *b*, are fixed at right angles, into which the crank pins *c*, *c*, *c*, *c*, are keyed firmly; or, in the event of the wheels being outside the framing, as some engine manufacturers may prefer, then these crank pins *c*, *c*, must be firmly placed in one of the arms or bosses of the wheels as usual; and to these crank pins the piston rods *d*, *d*, *d*, *d*, are attached by straps of metal or otherwise, without the aid of the ordinary connecting rod, the brasses of the crank pin at the head of each piston rod working in the grooved guides or races *d*,* *d*,* as shown at fig. 1; keep these two cranks at opposite angles to each other, and, being at right angles to the two on the other side of the carriage, cause the cylinders to vibrate upon their central bearing *e*, *e*,

the reciprocating motions of the pistons causing the cranks to revolve, and with them the axles and running wheels of the carriage.

The reciprocating motions of the pistons are obtained by the oscillations of the cylinders opening and closing the valves, and consequently effecting the ingress and egress of the steam in the following manner, which will be best understood by reference to fig. 4, showing the whole of the parts of the valve in detail, and being a longitudinal section of the same, taken at the dotted line in fig. 5.

The steam box or chamber *f*, *f*, consists of two annular cavities or recesses, the external one in connexion with the steam pipes, and the internal one in connexion with the eduction pipes; *g*, is the induction or steam pipe in connexion with the boiler, and charged with steam in any convenient manner; and *h*, is the eduction pipe, which conducts the spent steam from the engine; *i*, *i*, is the reversing plate, the faces or plan views of which are shown in back and front elevations in figs. 5, and 6; the face of the plate, as seen at fig. 6, lies close to the steam box, and the steam blows through the openings or ports *j*, *j*, *j*, into the cylinders. The other openings or orifices *k*, *k*, *k*, lie against the interior annular cavity, and, consequently, become eduction orifices. When no reversing motion is wanted, this plate may be cast fast on to the steam box in one piece; *l*, *l*, is another plate, having exactly similar cavities or openings to the last described, but turned with its face the reverse way about, and screwed to the seating of the cylinder *m*, *m*.

This cylinder seating is shown detached in plan view at fig. 7, (with portions of cylinders *c*, *c*, affixed), and vibrates with it, and consequently brings its orifices

alternately against the induction (or steam) and eduction (or escape) orifices of the reversing plate.

It must be observed that in fig. 4, the various pieces are all shown slidden a little space asunder on the shaft *e*, *e*, in order to represent them distinctly; but when in operation, they must all be in close contact, and ground so true that the valve shall be made perfectly steam tight.

It will be seen in fig. 7, that the face of the cylinder seating has two annular cavities or chambers, similar to the steam box, the outer annulus is connected with the tops of the cylinders by the steam passage *q*, *q*, and the inner annulus with the bottom of the same; the face fig. 6, being laid upon it and fixed, the orifices *n*, *n*, *n*, *n*, of face fig. 5, communicate with the bottoms; and the orifices *o*, *o*, *o*, *o*, communicate with the tops of the cylinders, and by the vibratory motion of the same, these cavities are alternately brought against the steam and eduction orifices of the reversing plate by which the supply and discharge of steam is effected.

When it is required to reverse the engine, the engineer moves the lever *p*, (see fig. 1,) slightly, which, being connected to the reversing plate by a link, as shown in fig. 8; the plate *i*, *i*, is partially turned round the shaft *e*, until a steam or induction orifice *n*, is in the position that was before occupied by the eduction orifice *o*, when the operations of the engine are immediately reversed. I would here observe that, if it should be found more convenient to convert the inner annulus of the steam box and cylinder seating into the induction or steam passage, and connect the outer annulus or cavity with the eduction pipe, the effect would be the same as that above described.

The improvements in marine and stationary engines,

will be seen in figs. 9 and 10; fig. 9, is a linear diagram, representing the essential parts of a stationary steam-engine, upon the high-pressure principle; and fig. 10, an elevation of a pair of cylinders in connexion with the paddle wheel shaft of a boat or marine engine. In these figures, *a*, is the fly wheel shaft, or crank shaft, or paddle wheel shaft; *b*, the crank; *c*, the crank pin; *d*, the piston rod, and *e*, the cylinder. The valve or steam box *f*, *f*, is mounted upon a horizontal shaft *g*, *g*, and this shaft forms the centre of vibration of the cylinder. In these instances, no reversing plate is shown; but the two surfaces *h* 1, *h* 2, of the valve, as formerly described, are brought into immediate contact, and, as the half of the valve *h* 1, vibrates with the cylinder, as already understood, the other half or steam box *h* 2, is fixed or stationary upon the shaft *g*, by which the ingress and egress of the steam is effected. It will also be evident, with reference to these engines, that this peculiar valve may be used to a fixed or stationary cylinder, by giving an alternate reciprocating motion to a plate or disc, provided with the proper orifices or ports, similar to the reversing plate (as before described), placed between the two valve facings *h* 1, *h* 2. It may be necessary here to remark, that, supposing fig. 10, to represent a diagram or plan view of a locomotive engine, instead of an elevation of a marine engine, it will be very evident that by making the paddle wheel shaft *b*, *b*, the ordinary crank shaft of the locomotive engine, that two cylinders (instead of four) may be applied to those engines by using my improved valve as here shown.

Having described the particular features of novelty in this invention, and the means of their practical application, the Patentee desires it to be understood that he does not intend to claim any of the well known

parts of the steam-engine already in use, and which have necessarily been alluded to in the above description; but he does claim as his invention, firstly, the mode of applying four cylinders to a locomotive steam-engine, or a direct driving power to each running wheel of the same, in the manner above described and shown; secondly, the application of a peculiarly formed face or disc valve, constructed upon the principle above described to locomotive, stationary, and marine steam-engines; thirdly, the introduction of a plate or disc between the two faces of the valve (which is called a reversing plate), for the purpose of reversing the stroke of the piston, by instantly converting the induction steam ports into eduction orifices, and *vice versâ;* and fourthly, the mode of keeping the cranks of locomotive engines upon one side of the carriage at opposite angles to each other, and, being at right angles to those upon the other side, to cause the cylinders to vibrate by means of the slides or parallel guides, as shown in the drawings.—[*Inrolled in the Rolls Chapel Office, August*, 1837.]

Specification drawn by Messrs. Newton and Berry.

To Miles Berry, *of the Office for Patents, Chancery-lane, in the county of Middlesex, mechanical draftsman, for certain improvements in machinery or apparatus for cleaning, purifying, and drying wheat, or other grain or seeds; being a communication made to him by a certain foreigner residing abroad.*—[Sealed 7th June, 1836.]

These improvements in cleaning, purifying, and drying wheat and other grain, or seeds, consists in the novel adaptation, construction, and arrangement of a series of

apparatus, by means of which, wheat and other grain or seeds may, by peculiar operations or processes of washing and subsequent drying, be perfectly purified and cleaned from smut, weevils, worms, and any other foreign or extraneous matters.

The operation is performed by a series of apparatus, the general arrangement of which is shown in Plate XVI., fig. 1. It is commenced by separating the bad from the good grains: this is effected by the following means:—The corn is introduced into a vessel of water, in which the sound grains, by their gravity, sink to the bottom; those which are defective, together with other light bodies that may happen to be mixed with the corn, float on the surface.

A hopper of undetermined size, but of sufficient capacity to contain a large quantity of the grain to be cleaned, is placed immediately above a small hopper, of such dimensions as to be capable of containing the quantity of grain adapted to the capacity of the apparatus, into which smaller hopper the lower extremity of the upper one opens. The two hoppers are each closed at their lower extremities by valves, worked by rods and compound levers, so contrived as alternately to open the discharging valve of one hopper on shutting the other; on lowering the rod, the valve of the upper hopper is opened and that of the lower one is shut, upon which the grain contained in the upper hopper descends into the lower one, where it gradually becomes heaped up in a pyramidical form until it completely closes the valve, and thus, without assistance, determines the quantity of grain to be successively submitted to the operations of the apparatus. On raising the rod, the valve of the upper hopper is shut and that of the lower one is opened,

and the quantity of grain contained in the lower hopper passes down through its valve; this is so constructed as to cause it to fall in a thin shower on to a large flat spout, with raised edges, which receives and conducts it into a vessel or vat filled with water, by which contrivance such grain falls into the water separately. If it be a sound grain, its weight causes it to sink; but if it be defective, and consequently light, it will float upon the surface.

Two portions of the upper rim of the vessel or vat, one at the front and the other at the back, are made lower than at the sides; to these lower portions are attached a curved trough sloping towards a waste pipe, which empties itself into a basket on the lower story. The grain, in falling into the vessel or vat, displaces a proportionate bulk of water, which, on flowing over into the trough, carries along with it the faulty grain, light seeds, and other matters which float on the surface. Water is then applied from a reservoir in fresh quantities, as may be required, by means of a pipe with a regulating cock.

The water is made to rise in the vat and to flow over into the troughs, driving over with it any defective grain or other foreign substances that may still remain, which thus completes the operation of separating the good grain from the bad grain.

The good grain being thus separated from the refuse, and still immersed in the water, is subjected to violent agitation by means of a series of rapidly revolving arms affixed to a vertical shaft, which work in the intervening spaces of stationary arms fixed to the sides of the vat or vessel. This operation is repeated in several waters, after intervals of repose, according as the state of the

grain may require; by which means the grain becomes thoroughly washed, and is cleansed from all extraneous matters that may have been attached to it.

After the washing of the grain has been effected, without stopping the rotary motion of the arms, a valve in the bottom of the vessel is opened, through the aperture of which the grain is precipitated into a tube, from whence it descends into a hopper placed under it. The hopper is formed of wire gauze, through which the water drains in its descent. The water is caught by an outer hopper of wood, which encloses the one of wire gauze. Both of these hoppers are placed above a drain for carrying off the water; the lower end of the wire gauze hopper rests upon a wooden trough, having flat sides and a semi-cylindrical bottom lined with suitable metal, above which is a false bottom of wire gauze of the same shape.

This trough is supported by feet, and inclined towards the hopper; contains an Archimedes screw made of suitable metal, the lower end of which lies under the open end of the wire gauze hopper, and receives the falling grain. By the rotation of this Archimedes screw, the grain is gradually conducted or propelled upwards towards the drying apparatus, that is, towards the opposite end of the trough, from whence it falls through an aperture in the wire gauze bottom into a receiving box; the water which drains from it in the passage, being carried off towards the waste drain by the inclination of the trough.

This receiving box has a semi-cylindrical bottom, and a wheel or pulley revolving within it upon a horizontal axle, which, with a corresponding wheel at the top of the bulding, drives an endless chain of buckets travelling through two vertical pipes. The buckets, in

passing upwards, successively fill themselves with the washed corn or grain contained in the lower box, and carry it up to the top of the building. The grain thus raised is discharged successively from the buckets into a shoot, from whence it descends into the drying apparatus.

The drying apparatus consists of a series of cylindrical vessels or hollow drums made of metallic gauze, stretched over metal framework, which are placed one above the other in a hot air chimney or flue, and mounted on axles slightly inclined to the plane of the horizon at similar returning angles. They are put into rotary motion by toothed gear, or other suitable means. These cylinders are so placed as to receive successively the grain which gradually descends from one into the other as they revolve. The axles of these cylinders turn in suitable bearings, the cylinders being contained within the hot air chimney, in the lower part of which a fire of coke or charcoal is made, or in which a hot air stove is placed.

The grain, when thus dried, passes from the lower drum of the series into a shoot, which conducts it into a receiving box. From this box the hot grain is taken up by another series of buckets attached to an endless chain, as in the former apparatus, and is from these buckets discharged in a similar way through a shoot into the upper drum of another series of hollow rotatory cylinders or drums mounted in an air tower, in a similar manner to those contained in the hot air chimney; but instead of the flue being in this instance a hot air chamber, it is merely a tower open at bottom, having a strong current of cold air passing through it, which perfectly cools the grain before it is ultimately discharged from the lower drum. The grain, by the consecutive

series of operations, is perfectly cleaned from all extraneous matters, and rendered fit for immediate use, or for depositing in store.

Having now described the general features of the improved machinery or apparatus, as well as the processes employed for cleaning, purifying, and drying wheat and other grain or seeds, the Patentee proceeds to describe the details of the machinery which has been found suited to the accomplishment of the desired object, but without intending to restrict the invention to the particular forms, positions, or dimensions of the several parts, as it must be obvious that every part of the machinery is susceptible of slight variation without in any degree changing the general principle of their construction, or of the operation to be performed. The novel features constituting the improvement, essentially consisting in combining the apparatus and machinery capable of conducting the processes successively, and without any necessity of waiting between each operation.

First, the process by which the defective and light grains are separated from the whole body of the grain subjected to the operation, is done by letting the grain fall in a thin shower upon the surface of water into an appropriate vessel, to the bottom of which the good seeds descend by their gravity, the defective seeds may be carried off by an upward current. Secondly, in submitting the grain to great agitation in a vessel of water, for the purpose of washing off all extraneous matters from its surface. Thirdly, in drying or evaporating the moisture from the washed grain by means of a current of hot air passed amongst the grains, whilst they are separated from each other and agitated by a rapid tumbling or tossing motion. Fourthly, and lastly,

in submitting the grain in a similar way to a current of cold air for the purpose of cooling or reducing its temperature to a fit state for grinding or putting in store.

Plate XVI., fig. 1, as before stated, represents in sectional elevations the whole series of apparatus employed for separating, washing, and drying the grain, and is constructed and arranged in consecutive connexion in one building; fig. 2, represents in sectional elevation (drawn upon a larger scale) one of the vessels in which the grain is separated and washed, with the appendages and machinery that actuates the washing apparatus.

In fig. 1, A, is a large hopper, into which the foul grain is to be first introduced, having a shoot at bottom through which the grain descends into a smaller hopper B, and from thence into the washing vessel C. The discharging orifice of the large hopper is closed by a slide valve *a*, and that of the smaller hopper by a similar valve *b*, which are both connected to a vibrating lever *c*. The end of this lever *c*, is attached to a crank rod *d*, and this crank having a pulley on its axle, is turned by means of a cord with handles. On drawing down one of the handles, the crank causes the lever *c*, to slide the valves *a* and *b*, so as to open the aperture of the larger hopper A, and to close that of the smaller B; by which means the grain is allowed to descend from the larger into the smaller hopper, and to accumulate in the latter until it has risen up sufficiently high to stop up the discharging orifice of the larger hopper. The valves *a*, and *b*, are then shifted by drawing down the other handle, which closes the discharging orifice of the hopper A, and opens that of B. By this means the quantity of grain contained in the lesser hopper is allowed to run out slowly in a thin stream through a

wide flat spout *f*, into the vessel or vat C. A reservoir D, placed in any convenient situation above, supplies water by a pipe *g*, which leads into the middle of the vessel C, and by means of the pipe the vessel C, becomes filled, when the pipe is to be closed. The grain is now allowed to fall upon the surface of the water from the spout *f*, in a thin stream as above described; and as the greater part of the lighter or defective grain or seeds will naturally float, they are carried off by the overflowing of the water, see fig. 2. The stop-cock of the pipe *g*, being now re-opened, the water continues to pass in a stream into the vessel C, and, in rising, forces up such of the defective grains as have been immersed, and causes them also to flow with the waste water over the sides of the vessel into a trough E, which leads to a waste pipe *e*, and these refuse grains may be collected in a basket placed under the waste pipe.

When the grain contained in the hopper B, (which holds the quantity intended to be separated and washed at one operation) has all passed into the vessel C, the valve *b*, is closed, and the valve *a*, again opened for the purpose of filling the lesser hopper ready for the next operation.

The separation of the good from the defective grain having been thus effected, the cock of the pipe *g*, is to be closed, and the heavy grain which has descended in the vessel C, is now to be subjected to the operation of washing.

For this purpose, the vertical shaft F, with all its arms *h*, *h*, *h*, shown in fig. 2, mounted in the vessel C, is to be put into rotary motion between the fixed arms *i*, *i*, *i*, in order to agitate the grain, which is done by means of bevel gear, in the way shown in the figures.

The rotary motion of the shaft and arms should be slow at first, but may be increased as the washing of the grain proceeds.

When the operation of washing the grain has been thus carried on for some time, the dirty water is to be discharged from the vessel o, by sliding the valve *k*; the orifice of which must be covered with wire gauze to prevent the escape of the grain. On closing the valve, water is to be admitted again into the vessel for the further washing; and this changing of the water *s*, may be repeated two or three times, as the condition of the grain may require: when the washing operation has been completed, the water is to be withdrawn from the vessel as before, and a slide valve *l*, opened in the bottom of the vessel for the purpose of discharging the grain down a shoot *m*, into a broad wire gauze hopper G, the position of which is shown in fig. 1. The wet grain having fallen into this hopper, the water drains off through the wire gauze, and the grain descending to the bottom, passes thence into the inclined trough H, in which the Archimedes screw I, revolves. The periphery of the screw I, works nearly in contact with a false bottom of wire gauze placed along the trough, and as the screw revolves, it gradually carries forward in the trough the grain descending from the hopper, the water draining off through the false bottom, and running down the trough into a waste drain below.

The Archimedes screw is made to revolve by means of toothed gear, and by its rotation the grain is conducted into a semi-cylindrical trough K, seen in fig. 1. Through this trough K, an endless chain of buckets *n*, *n*, *n*, is made to travel, as the lower carrier wheel, or

pulley L, revolves; and, in so doing, the buckets successively take up the grain from the trough K, and carry it to the top of the building.

In the apartment at the top of the building, a carrier wheel or pulley M, is mounted, corresponding with the wheel L, below, over which two carrier wheels the endless chain of buckets is extended. Behind the wheel M, a hopper N, is placed, which receives the grain as it falls out of the successive buckets on their turning over; by the rotation of the wheel M, from the hopper N, the grain passes through a spout *o*, into the upper of the series of drying cylinders O, which revolve on axles.

These drying cylinders or drums are of metallic gauze, extended over frames formed by broad, but thin, rings of metal, some of which rings have cross arms, by which they are attached to the axle. These rings are braced together by broad, thin longitudinal bars extending inward, for the purpose of forming ledges, and with rings denoting the internal periphery of the drum into compartments; these compartments are for the purpose of interrupting the progress of the grain as it passes along the cylinder, and causing it to be thrown over, and progressively advanced toward the end in helical curves.

The drying cylinders are mounted in the hot-air chimney or flue P, P, P; they are so placed that their axles form small angles with the plane of the horizon, and are situated one above another at opposite or returning angles, so that the grain, descending from the uppermost cylinder, may fall into the next below, and so on, travelling through the successive cylinders in the way described: the cylinders are made to revolve by means of toothed gear *q*, *q*, *q*, from the under driving shaft.

Suppesing the grain to have been delivered by the

buckets into the upper cylinder, and to have been carried along in the manner above explained, it would ultimately fall out of the lower end of the cylinder into the hopper *r*, and from thence pass down into the next lower cylinder to be conducted through it in like manner.

The end of the cylinder is closed by a disc of metal having an aperture, through which the grain passes to the interior. This disc is fixed to the lower part of the hopper, and the end of the cylinder turns upon it, the edge of the disc being embraced by a couple of rings fixed to the end of the cylinder.

The hot-air chimney or flue is constructed at the lower part of brickwork, and the upper of framework, with wooden shutters, (partially shown in fig. 1,) in order to allow of ready access to the cylinders. The chimney should be so constructed as to allow of no passage for the air but through the spaces between the bars or tubes forming the grating of the fire-place. A current of air produced by the ignition of fuel placed in the furnace or stove, becoming charged with caloric in its passage through the fire, ascends with a rapidity proportioned to the combustion and draft, carrying with it the moisture with which the descending grain is charged.

The grain is delivered from the lower cylinder of the series into a shoot V, which conducts it by a pipe into a receiving box, not shown, but similar to the box K, described above. On the hot grain reaching the receiving box by the pipe or tube which leads from the last rotatory cylinder O, of the chimney or flue P, it is taken up by a second endless chain of buckets in a cold-air tower, not shown. The buckets, as they carry up the grain and pass over the upper pulley, deliver it by means of a shoot or pipe into the end of the first cooling cylinder, similar to those of O, where it undergoes

precisely the same motion as in the drying process, and passes out of the opposite end of the first cylinder into the second cylinder, and so on throughout the whole series of rotatory cylinders or drums, until it reaches the last one, from which it is delivered, by a shoot or pipe, on to the floor of the building, or into receptacles placed to receive it, and the operations are completed. The now cleaned, dried, and cooled grain being in a state fit for immediate use, or for depositing in the store.

The cold-air tower is fitted with doors at the bottom, and with shutters or doors at the sides, for the purpose of allowing free access to the cylinders, for the purpose of adjustment or other purposes.

The Patentee says, in conclusion, "I would remark, that there are adapted to this apparatus two endless chains of buckets, and two sets or series of rotatory cylinders in the hot-air chambers; and also two sets of cylinders in the cooling tower, which are requisite for carrying on the operation of four washing apparatus: but when only two washing tubs are used, only one endless chain of buckets, and only one set of rotatory cylinders in the hot-air chimney and in the cold-air tower need be used. And, further, that the apparatus should be extended in the same proportion, when the operations are conducted and carried on in a more extended scale than that above stated or described."—[*Inrolled in the Rolls Chapel Office, December,* 1836.]

Specification drawn by Messrs. Newton and Berry.

To George Sullivan, *of Morley's Hotel, Charing-cross, in the county of Middlesex, gentleman, for improvements in machinery for measuring fluids; being a communication from a foreigner residing abroad.*—[Sealed 3d December, 1836.]

This invention consists in combining the motion of two flexible pistons or surfaces acted on by fluids, by means of certain levers and connecting rods, in order to obtain continuous rotatory motion to a cock or valve through which the fluid to be measured has to pass, in order to the quantity being indicated, as will be hereafter described.

Plate XV., fig. 11, shows a side view of a meter, having the improvements applied thereto, parts being shown as cut away in order to the internal arrangement being seen. Fig. 12, is a plan of the meter, the top plate or cover being removed. Fig. 13, is a plan of the meter, with the top plate or cover in its place. Fig. 14, shows a transverse section of the meter, by which the position and nature of the flexible pistons or surfaces are applied, and work.

Fig. 15, is a plan of one of the flexible pistons or surfaces; fig. 16, is a plan or section of the pipes or ways for the passage of gas to and from the flexible pistons or surfaces; fig. 17, is a plan or under-side view of a revolving cock or valve; fig. 18, is a plan or upper-side view of the same cock or valve; and fig. 19, is a side view of such cock or valve. In each of these figures, the same letters of reference indicate the same parts: *a, a,* being the external chamber, which is, by preference, of a cylindrical form, as shown in the drawing. This chamber *a, a,* is divided by a plate *b,* into

two equal parts, and these two equal parts, by means of flexible pistons or surfaces *c, c*: hence the chamber *a, a*, is divided into four equal compartments, Nos. 1, 2, 3, and 4, which are separated from each other, and the gas in one has no communication with another. But they each have a communication through the cock or valve *d*, into the chamber No. 5, which is at the top of the meter; and each of the compartments, Nos. 1, 2, 3, and 4, are, by the aid of the cock or valve, made to communicate with the induction or gas supply pipe *e*; hence the gas coming in at *c*, cannot pass to the chamber No. 5, without having acted on the flexible pistons or surfaces *c, c*, all which will be readily understood when I describe the action of the meter *f, f*, on the axis of the flexible pistons or surfaces *c, c*; they pass through the top of the lower compartments, and are supported by suitable conical stuffing boxes, in order to prevent the gas passing from the compartments Nos. 2, and 3, into the chamber No. 5.

The flexible pistons *c, c*, are attached to these axes *f, f*, by means of arms *g, g*, which being affixed to the axes *f, f*, as is shown in the drawing; and the other ends of the arms *g, g*, being connected by a moveable point to the circular plates which form the centres of the flexible pistons or surfaces; these being attached by their edges to the interior sides of the case, as hereinafter shown, the axes *f, f*, will be actuated by the movement of their flexible pistons or surfaces *c, c*, as will be readily understood by an examination of the drawing.

The flexible pistons or surfaces *c, c*, consist of any suitable flexible material, which is securely affixed within recesses formed within the chamber *a, a*, of thin sheet lead, there being a circular wire hoop to each recess, and the edges of the flexible materials of which

the flexible pistons *c*, are formed, being put around the hoop, the pistons are thereby made gas-tight, the lead or other thin metal of which the recesses are formed, being turned down on the flexible material, and thus binding the flexible material between the sides of the recesses and the wire hoops; and in order to ensure a gas-tight joint, bees-wax, or other suitable material, may be used between the surfaces of the recesses and the wire.

The centres of the flexible pistons or surfaces are each held between two circular plates of tin or other suitable material, which plates are rivetted or otherwise affixed together; and to these plates the staples or openings (for the connecting pins of the arms *g*, *g*, to work in) are affixed.

The flexible material of which the pistons *c*, *c*, are made, is of the best oiled silk of commerce, which I have found to wear for a considerable length of time; or it may be of thin deer-skin leather, or other leather or animal membrane, saturated with bees-wax mixed with neat's-foot oil, or any suitable material which will offer the least possible friction on the bending thereof, and be as little liable as possible to be injured by the chemical action of gas, and at the same time of a close texture, to prevent the gas passing from one compartment to another.

At the upper end of the axes *f*, *f*, are affixed the arms *h*, *h*; and to these arms *h*, *h*, are connected, by pin joints, the rods *i*, *i*, as is clearly shown; and the rods *i*, *i*, are connected together by the passage of the cranked wire *j*, through an eye or opening formed in each of the connecting rods *i*, at the ends opposite to where they are connected to the arms *h*, *h*.

The cranked wire *j*, moves in suitable bearings in a

bracket *k*, as is clearly shown in the drawing. At the upper end of the cranked wire *j*, is affixed a toothed pinion, which actuates a series of wheels and pinions, by which the number of revolutions of the cranked wire *j*, are indicated, and the quantity of gas which has passed through the meter will be registered, as is well understood by gas-meter makers.

It should be remarked that the flexible pistons or surfaces *c*, *c*, should be so set in respect to each other, as not to arrive at the end of that movement at the same time, but that one should be in full action at the time the other comes to the end of the stroke. This may be done by making the arms *h*, *h*, *i*, *i*, of such length, that the arms *i*, *i*, when their ends are united free from the crank, and are brought or placed for the purpose over the centre of the valve, these ends will form with each other a right angle. This is the test of the proper length of these arms.

I will now proceed to trace the manner in which the parts act, in order to produce rotatory motion to the cock or valve, and, consequently, an equal or nearly continuous flow of gas into the chamber No. 5, and from thence to the outlet pipe. It will be seen that the lower end of the cranked wire *j*, rests against either of the projections *k*, *k*, of the valve in fig. 18, and by the rotatory motion of the cranked wire *j*, caused by the working of the flexible pistons *c*, the valve *d*, will be moved round in the direction of the arrow thereon, and thus obtain rotatory motion, the part *l*, of the cock or valve acting as an axis. In tracing the action of the parts, it will be desirable to call attention to the nature of the cock or valve, and to the pipes or ways shown in figs. 16, 17, 18, and of these being well understood, the working of the other parts, and the

operation of one part on the other will be quickly seen.

On the pipes or ways *m*, *n*, is affixed what may be called the seat *o*, of the cock or valve, this seat has four openings 1, 2, 3, and 4, corresponding with the compartments Nos. 1, 2, 3, 4. The gas supply pipe *g*, passes under, and is connected with the central opening *p*, of the seat *o*; hence, all the gas from the pipe *g*, passes up through the pipe *p*, and the short tube or part *l*, of the cock or valve working within the opening *p*, the gas flows into the upper portion of the cock or valve, which consists in the following parts, the circular plate *r*, which rests on the plate *o*, and the plate *r*, being ground together to produce an uneven gas-tight surface or joint.

The plate *r*, has two openings *s*, *t*, each of them equal to cover two of the openings 1, 2, 3, 4, in the seat or plate *o*; on the plate *r*, is affixed the projecting ring *v*, which, surrounding the opening *s*, and the end *t*, divides the plate *r*, into two parts, and the projecting ring *v*, being covered by the plate w, produces a chamber into which the gas flows from *g*, before it enters either of the openings 1, 2, 3, 4; hence, whichever of the openings 1, 2, 3, 4, over which the opening s, is, those two openings will be open to the supply of gas to their respective chambers, and it will be seen that the opening *t*, of the plate *r*, opens into the chamber No. 5; hence, whichever of the openings 1, 2, 3, 4, over which the opening *t*, at any time stands, will permit the passage of the gas or fluid from their respective compartments to flow into the chamber No. 5. Thus, supposing the opening *s*, to be over the openings 1, and 4, the gas will be flowing from the pipe *g*, into the compartments Nos. 1, and 4, and the opening *t*, will at the same time be over the openings 3, and 2, by which

means the gas in the compartments Nos. 3, and 2, will be permitted to flow from those compartments into the chamber No. 5, and from thence to the burner or point of delivery; and the flowing of the gas into the chambers Nos. 1, and 4, will propel the flexible pistons or surfaces *c*, and by the connecting rods, and by the cranked wire *j*, the cock or valve will be caused to perform a continuous rotary motion, and these open a way into each of the compartments Nos. 1, 2, 3, and 4, for the flow of gas from the pipe *g*, and from these compartments into the chamber No. 5, and so on continuously as long as the gas or fluid runs. The meter here shown is of a proper size for indicating the passage of one fifth of a cubit foot from the pipe *g*, to the chamber No. 5, for every revolution of the cranked wire *j*. Having thus far confined the description of the invention to gas meters, I would now remark that it will be evident that if water or other fluid were to be permitted to flow through the pipe *g*, and flow off from the eduction way, the quantity passing would, in like manner, be indicated. The mode of regulating this instrument so as to make some aliquot portion of a cubic foot to be measured by each complete revolution of the valve, is, by making the arm of the crank of such length by experiment in the construction of each size of these meters, as that with the aid of a test gasometer, the requisite quantity will be passed, be it a fifth or a sixth or other part of a cubic foot, it being obvious that the smaller the diameter of the circle which the ends of the arms *i*, *i*, describe, the less is the range of the pistons, and the less is the quantity of fluid they suffer to come into the compartments in which they respectively move, and *vice versâ*. It is also plain that the quantity passed in each meter by each operation, must

also depend upon the size of the induction and eduction tubes, and of the holes in the valve seat and valve.

Having thus described the nature of the invention, and the mode of combining the various parts in the best manner I am acquainted with, I would remark, that I am aware that gas and other meters have been before made having flexible pistons or surfaces similar to those above described, but acting very differently so far as their action is communicated to the cock or valve through which the fluid passes; I do not, therefore, claim as a new invention the application of flexible pistons or surfaces generally for such purposes; but I do declare that the invention for which these Letters Patent have been obtained, consists in the combination of two flexible pistons or surfaces acting by means of jointed and connected pitmen as aforesaid, upon a rotary valve constructed substantially as aforesaid, in a case with compartments substantially as aforesaid, whereby gas or other current fluid entering into the case or meter is allowed to pass through, or being drawn off from it, the current will work the meter, and all the fluid that passes through it be measured substantially as aforesaid.—[*Inrolled in the Inrolment Office, June,* 1837.]

To GEORGE SAINT LEGER GRENFELL, *of Paris, in the kingdom of France, merchant, at present residing at No. 4, Cadogan-place, Sloane-street, in the county of Middlesex, for certain improvements in the construction of saddles.*—[Sealed June 5th, 1834.]

THIS invention consists in constructing a saddle of *wood without any padding,* which the Patentee states

will be cooler to the horse's back, and will not chafe or hurt it as some of the ordinary saddles do, and will also have the advantage of being much lighter. The Patentee states that he constructs the saddles so exactly to fit the horse's back, that they press on every part alike, and thus prevent any particular part from being chafed or rubbed. The saddle is to be constructed in such a manner that it must not bear upon the back bone, but upon the dorsal muscle. This seems to be the whole of the Patentee's invention; but he states that he sometimes combines iron with the wood in constructing the saddles, but in all cases where iron or other metal is used, care should be taken that it does not project out from the wood, but be carefully let into it, so that it does not present any hard and uneven surface that may cause pain or inconvenience to the animal.—[*Inrolled in the Rolls Chapel Office, December*, 1834.]

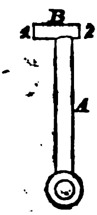
ORIGINAL COMMUNICATION.

(To the Editor of the London Journal of Arts.)

Sir,—The theory of employing fluids on the principle of Barker's mill, for impelling machinery, though in appearance so exceedingly simple, is acknowledged to be but imperfectly understood. The common notion is, that the rotatory motion is occasioned by the resistance offered by the atmosphere to the issuing fluid; the atmospheric air acting as a sort of abutment, resists its progress, by which it is enabled to impel the revolving body: this, though a common notion, appears to me to be a fallacy, neither agreeable to, nor warranted by facts. I will endeavour to show that the resistance of the atmosphere is no assistant in producing motion, at all events not in the manner conceived; but, first, I will premise, by laying it down as an axiom which, I believe, will not be controverted, that the expenditure of elastic fluids, when flowing freely into the atmo-

sphere, is limited and governed, like non-elastic fluids, by the well-known law, viz. that their velocities are to each other as the square root of the pressure; and that such velocities being the greatest that the elastic force is capable of generating, the particles cannot expand or attenuate in the line of projection; hence, up to the very instant it makes its exit into the atmosphere, when it obtains liberty to expand *laterally*, the *density* and *elastic force* of the fluid is *maintained undiminished*, whether it flows through a tube or a simple orifice; this being the case, the re-action of elastic fluids is as perfect as those that are non-elastic, and possess greater advantages, as will be pointed out hereafter.

I will now proceed to consider the accompanying diagram: A, is an arm, supposed to be revolving on a centre, and conducting steam to the pipe B, fixed at a right angle thereto. Now (keeping all idea of the atmosphere and its supposed effect out of view for the present), I will suppose the pipe B, to be closed at both ends, when it is evident that the steam will be retained, and will press equally upon the whole of its interior surface; and that, as every portion of such surface has an opponent, it follows that the pressure of the steam is held in equilibrium, and no motion can possibly ensue; but if the end No. 1, be removed, the opposing surface to the end No. 2, no longer exists; consequently, the equilibrium is destroyed, a flow issues from the orifice with a velocity due to the pressure; and as the pressure is maintained up to the moment of discharge, as laid down above, the end No. 2, is, therefore, subject to the pressure the same as before the end No. 1, was removed; and having no opposing surface, in consequence of such removal, to counterbalance that pressure, it follows that the arm A, is impelled by a constant force, say of forty pounds, assuming the steam to be of that pressure per inch, and the orifice of an inch area. Now, this is independent of any atmospheric influence whatever, and would clearly be the effect were the arm enclosed and working in a vacuum.



I will next consider what influence the atmosphere would exer-

cise if the arm were working in that medium. First, then, I will suppose the chamber in which the arm revolves to be filled with steam of the same density as that supplied to the arm from the boiler: in such case it is manifest no flow of steam from the orifice could take place—no motion of the arm could result—all would be in a state of equilibrium; if, then, the steam be removed from the chamber, and air of the same density substituted, the result would be precisely the same; and yet air is considered to be the abutment which enables the steam to impel the arm. Why then does motion not ensue? Simply because the air presses against the end No. 2, with the same force with which it resists the force of the steam at the orifice; hence it is clear that it is the steam alone that produces the motion. If the air were reduced to atmospheric pressure, the effect would be the same, as regards its influence: it would oppose the issuing steam on the one hand, and the velocity of the arm on the other, in an equal degree, supposing the velocity and the area of surface of both to be the same. As air then is no assistant, the machine will move with greater velocity in a vacuum than in that medium, supposing the pressure of the steam employed to be the same in both cases as the velocity will always be, that which is due to the difference of pressure between the steam and the medium in which the arm revolves: hence steam of twenty-five pounds, discharged into a vacuum, will have an equal velocity with steam of forty pounds, discharged into the atmosphere; and the effect would be the same with rockets and all bodies impelled in like manner. From the driving power exerted on the end No. 2, being equal to the utmost effort of the steam under every possible circumstance, as above shown, any difference of opposition to the issuing fluid and the end of the arm, arising from a difference of velocity, will not add one grain to the force exerted against No. 2; nor will any surface interposed as an abutment, while freedom of escape is permitted, add one iota to the power, as the instant the steam passes the orifice, all its useful effort, as regards the arm, is at an end; nor, indeed, would even a piston, were it possible to apply one, add any thing to the force exerted, as its only effect would be to control the velocity of the steam, and prevent that waste which arises from the velocity of the steam exceeding that of the arm.

From the above may be deduced, first, that the atmospheric air, or any other medium, acts only as a retarder of the velocity, and not as an assistant, by becoming an abutment, as has been generally received; and, second, that the limit of velocity is the true abutment, if I may so term it, which maintains the density of the steam till the moment of exit, and thus applies the utmost effort the steam is capable of exerting, to the propulsion of the revolving body.

Such, then, I conceive to be the true theory of what is termed re-action; but the economy of this mode of applying steam is as yet problematical.

That very simple and inexpensive machine, denominated Barker's mill, has a defect to which steam-engines on the principle are not liable, from the circumstance of steam being comparatively a non-ponderable body while water is ponderable; and, consequently, as it must acquire the velocity of the aperture during its passage through the arm previous to its discharge, it will cost, supposing the arm to move at two-thirds of the velocity of the issuing fluid, four-ninths of the power exerted, for it costs, according to the well-known law, four-ninths of the power to give the same volume two-thirds of any given velocity; so it will, in this instance, although contained in a tube; hence, five-ninths of the force exerted only is left available for the propulsion of machinery. I do not here take notice of the centrifugal force, as that does not appear to alter the question, for, notwithstanding that that force increases the power of the water at the aperture, it at the same time increases the expenditure, and, of course, the quantity of supply passing the arm in a given time, which has to receive the velocity of the aperture at the expense of the power.

The same defect also is obtained in the attempts to propel vessels by forcing water from the stern, which three years since called my attention particularly to the subject, with this additional difficulty, however, that while paddle wheels move forward to the supply on which they act, and therefore it costs nothing, the obtaining the supply by indraft for internal machinery will cost as much, supposing the apertures of admission and discharge to be of equal area, as the expulsion of the volume. Thus, double the power is required in the first instance, in consequence of this cost of supply;

and, second, the retention of the water in the vessel, during the operation, will cost four-ninths of the re-acting force, leaving only about one fourth of the actual power, as applied to paddle wheels, effective for the propulsion of a vessel by such means, supposing such means to be otherwise efficient: hence, there exists but little hope of a successful result.

I am, sir,
Yours, obediently,
WILLIAM GILMAN.

SCIENTIFIC ADJUDICATION.

COURT OF COMMON PLEAS—BEFORE CHIEF JUSTICE TINDAL.

JONES *v.* HEATON.

Mr. Serjeant Wilde for the plaintiff; Mr. Serjeant Talfourd for the defendants. The subject of this action was an alleged infringement of the plaintiff's patent right in certain machinery for making bricks, for the specification of which see vol. ix. of our present Series, page 267.

In the plaintiff's patent, several different constructions of apparatus were proposed, in some of which the bricks were moulded in recesses formed in a circular table, and pressed out of the moulds when formed by means of pistons, acted upon by a circular inclined plane, and were carried away upon wooden pallets which had been previously placed in the moulds. Other contrivances were also proposed, as a series of moulds formed in a rectangular frame, from which the bricks were discharged by pistons in different ways. The alleged infringement, however, applied only to the circular moulding table.

The resemblance as to the general features of the plaintiff's and defendants' machines was admitted, but the defendants had many improvements in the detail, of which the design set out in the plaintiff's specification appeared to be deficient. Some bricks had been made by the plaintiff and sold, though considered rather defective; a much larger quantity had been made and sold by the defendants, with which no fault was found.

The defence set up was, that the plaintiff had no knowledge of

any circular brick-making machine at the time of obtaining his patent, and that from the public using of the defendant's machinery (for which no patent had been taken), the plaintiff had availed himself of a knowledge of its construction, and had incorporated the defendants' machinery with his own in the specification of his patent, inrolled six months after the grant of this patent.

In support of this defence the history of the two inventions and their progress towards the maturity of the two machines, was attempted to be drawn out of the witnesses on either side. It appeared that the plaintiff had given orders for various apparatus to different tradesmen between the periods of the sealing of his patent and the inrolment of his specification, but no parts of a circular machine were made by him until after his specification had been inrolled. The defendants proved the existence of the first drawings or scheme of their machine, having a circular table with pistons worked by inclined planes, long before the date of the plaintiff's patent, and traced its progress, and the dates of their first rude model exhibiting its principles, the making of patterns for casting the circular table and the pistons, the accidental breaking of some of the parts of the machine in conveying it from the engineer's shop to the brick ground, and the consequent delay in putting it into effective work, the making of a few bricks by way of experiment, and the ultimate working of the complete machine, before the plaintiff had lodged his specification. The employment of certain parts of the machine specifically claimed as new by the plaintiff, such as inclined track-working pistons and pallets in the moulds, was proved to have been suggested by several patentees many years ago, but not under the same arrangement as that proposed in the plaintiff's specification.

The jury, however, returned a verdict for the plaintiff, considering that the particular arrangement of the machinery specified, had not been known to the public, or *beneficially* used by the defendants *prior to the date of the plaintiff's patent;* and as there was no evidence to show what was really the invention intended to be m*a*e the subject of the patent at the time when it was first applied for, the judge held that the plaintiff had a right, indeed was bound, to give in his specification the most improved state of his invention up to the time of inrolling his specification.

SCIENTIFIC NOTICES.

REPORT OF TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS.

(Continued from p. 321.)

April 4, 1837.

BRYANT DONKIN, Esq., V.P., in the chair.

"Result of experiments made with a view to determine the best figure and position for wooden bearers, so as to combine lightness and strength; by James Horne, F.R.S.; A. Inst. C.E."

The results of several experiments on wooden bearers of different sections are tabulated; together with the dimensions and weights of the pieces, and the nature of the fracture. The conclusion at which Mr. Horne arrives is, that a triangular prism placed with its base upwards is the strongest figure and position; that with an edge uppermost the weakest for a given quantity of material.

The subject of the vibrations produced in the soil by the passage of locomotives and coaches was discussed, and several instances were mentioned, in which the vibration of the soil was sensible at the distance of a mile and a half during an observation by reflexion. It was stated that the experiments recently made for determining the effect which the passage of the locomotives at a small distance might have on the observations at the Royal Observatory had not been conclusive; but that as no sensible effect could be produced on any observations but those by reflexion, no apprehension of inconvenience was entertained.

It was also stated that a number of persons running down the hill in Greenwich-park produces a slight tremor, which is quite sensible during an observation by reflexion, and that the shutting of the outer gate of the Observatory throws an object completely out of the field of the telescope.

The comparative merits of the single pumping and of the crank engine for the purposes of raising water were discussed.

Mr. Simpson stated that it was a generally received opinion that a single pumping engine would do one-third more duty than a crank engine; but that having recently had a crank engine altered by Messrs. Maudslays and Field, and fitted with expansion valves, it did the most duty. The two engines were worked from the same boiler. The duty of the crank engine was about thirty-two millions; it works to a fixed lift which is in some respects advantageous. The duty of the Cornish engines is reported at ninety-five millions; and an engine near London, in which the Cornish valves and system of clothing had been adopted, was doing a duty exceeding fifty millions.

With respect to the Cornish engines, it was stated that their superior duty is due to the system of clothing; that although many persons had examined their duty, the calculations appear to be made from the contents of the working barrel; that the Cornish bushel is 90 or 94 lbs. of a very superior coal; the London bushel being only 80 or 84 lbs.; that, notwithstanding the great duty done by the pumping engines, the crank engines in Cornwall are doing less duty than the crank engines in London.

"Notice concerning the Thames Tunnel; by Richard Beamish, M. Inst. C.E."

Several attempts have been made in former years to effect a communication betwixt the opposite shores of the Thames by means of a tunnel, all of which, however, failed. In 1798, Dodd proposed a tunnel at Gravesend; and in 1804, Chapman projected one at Rotherhithe; and in 1807, Vazie commenced the construction of a shaft, eleven feet diameter, at a distance of 315 feet from the river. With Vazie was associated Trevethick, a man of great practical knowledge as a miner, and by indefatigable labour, a drift-way, five feet in height, two feet six inches in breadth at the top, and three feet at the bottom, was carried 1046 feet under the river. In the spring of 1808, having first ascended from under a rocky stratum, though with a depth of at least twenty-five feet betwixt them and the bed of the river, the Thames broke in upon them, and not a single brick having been laid, the work was irretrievably lost.

In 1823, the subject of a tunnel was again agitated, and a company was formed to carry into execution the plans of Mr. Brunel. The first proceeding was to sink a shaft. Twenty-four piles, with a shoulder on each, were first driven all round the circle intended for the shaft. One side of a wooden platform or curb was then laid on this shoulder, whilst the other side rested on an iron curb, having an edge below to which it was attached. Through this curb, ascended forty-eight wrought iron bolts, two inches diameter, to the height of forty feet, the height to which it was proposed to raise the shaft. The regular building of the tower on the curb, with bricks laid in cemen was proceeded with, and yet farther bound together by twenty-six circular hoops of timber, half an inch thick, as the brick-work was brought up. At the top of the tower was placed another curb, and the long iron bolts passing through it, having their ends formed into screws, the whole was screwed solidly into one mass, and completed in three weeks. In a week after it was finished, sixteen of the piles having been driven, two by two, opposite each other, the whole structure was sunk half an inch, carrying down with it the remaining eight piles, on which it was brought to a rest uniformly and horizontally, thus permitting the sixteen piles to be abstracted by opening the ground at the back. The whole weight supported by these eight piles was about 910 tons (the weight of the shaft). Having been left for three weeks to dry, and gravel having being heaped under the curb, the remaining eight piles were removed, two by two, till the mass rested on a bed of gravel. The machinery, viz. the thirty-horse high-pressure steam-engine, with gear for raising the excavated soil, was now fixed on the top. The miners were placed inside, and by excavating from around the bottom, the whole descended by its own gravity.

Mr. Beamish then describes the peculiar difficulties which were experie ced previous to the first irruption.

The chasm in the bed of the river, formed by the irruption of 1827, was stopped by bags filled with clay, with hazel rods passed through them; and the interstices filled by gravel. The irruption of 1828 was met by similar means, but the funds of the com-

pany not being then sufficient for proceeding with the work, the shield was blocked up with bricks and cement, and a wall four feet in thickness was built within the tunnel.

For seven years the work was abandoned, till, in 1835, a Treasury loan was granted, subject to the condition that the most dangerous part of the tunnel should be executed first. On resuming the works, the first object was to provide a drain for the water from the shield, for which purpose two reservoirs were formed under the middle pier, from which drifts were formed to the bottom of the great excavation and shield. The water was abstracted from the shield at the lowest point, and the pipes of two pumps worked by the steam-engine being brought into the reservoir, all the difficulty of the drainage was overcome.

The removal of the old, and the introduction of the new, shield was a work of no ordinary difficulty. The bricks and cement had, by the strong oxide of iron which the water contains, been converted into a mass harder than most rocks; and not less than 1646 of surface, 342 of which constituted the ceiling, had to be supported on the removal of the brick-work previous to the introduction of the new shield. The means, however, adopted by Mr. Brunel, and which are described in the paper, were perfect successful.

List of Patents

Granted in Scotland between 22d January and 22d February, 1838.

To William Losh, of Benton-hall, Northumberland, for improvements in decomposing muriate of soda (common salt), parts of which are also applicable to the condensing vapours of other processes.—26th January.

— Thomas Moore, of Ison-green, Nottinghamshire, for improvements in machinery for framework-knitting.—29th January.

— Luke Barton, of Arnold, Nottinghamshire, hosier, for certain improvements in machinery for framework-knitting.—31st January.

— Ambrose Ador, of Leicester-square, London, for certain im-

provements in producing or obtaining motive power.—9th February.

To Henry Davies, of Stoke Prior, Worcestershire, engineer, for certain improved apparatus or machinery for obtaining mechanical power, also for raising or impelling fluids, and for ascertaining the measure of fluids.—9th February.

— David Wilkinson Sharp, of Bingley, Yorkshire, engineer, for certain improvements in machinery or apparatus for washing worsted, linen, cotton, silk, or other yarns.—9th February.

— James Matley, of Paris and Manchester, for certain improvements in machinery for the operation of tiering, used in the printing of cotton, linen, and woollen cloths, silks, papers, and other substances which block printing is or may be applied. —13th February.

— William Palmer, Sutton-street, Clerkenwell, London, for improvements in printing paper hangings.—19th February.

— Ambrose Ador, of Leicester-square, London, for certain improvements in lamps or apparatus for producing or affording light.—19th February.

New Patents
SEALED IN ENGLAND,
1838.

To Matthew Heath, of Furnival's Inn, in the city of London, Esq., for improvements in engines to be worked by steam or other fluids, being a communication from a foreigner residing abroad.—Sealed 27th January—6 months for inrolment.

To William Bate, of Werrington, in the county of Northampton, Esq., for his invention of certain improvements in obtaining and regulating power.—Sealed 27th January—6 months for inrolment.

To Charles Flude, of Long-lane, Bermondsey, in the county of Surrey, manufacturing chemist, for his invention of improvements in applying heat to the manufac-

ture of alkalies and salts, and for smelting and otherwise working ores, metals, and earths.—Sealed 30th January—6 months for inrolment.

To Charles Phillips, of Chipping Norton, in the county of Oxon, surgeon, for his invention of improvements in apparatus or machinery for punching, bending, cutting, and joining metal, and for holding or securing metal to be punched, bent, cut, or otherwise operated on, parts of which machinery are adapted to perform some of these operations on other materials.—Sealed 30th January—6 months for inrolment.

To John Barnett Humphreys, of Southampton, civil engineer, for his invention of improvements in marine and other steam-engines.—Sealed 30th January—6 months for inrolment.

To David Wilkinson Sharp, of Bingley, in the county of York, worsted spinner, for his invention of certain improvements in machinery or apparatus for warping worsted, linen, cotton, silk, or woollen yarns.—Sealed 30th January—6 months for inrolment.

To William Holme Heginbotham, of Stockport, in the county of Chester, gentleman, for his invention of certain improvements in the construction of gas retorts. —Sealed 31st January—6 months for inrolment.

To George Ryder Peppercorne, of Vauxhall, in the parish of Lambeth and county of Surrey, gentleman, for his invention of an improved machinery to be employed for locomotion on railroads and other roads, which is also applicable to other engines for exerting power.—Sealed 31st January—6 months for inrolment.

To George Charlton, of Wapping, in the county of Middlesex, master mariner, for his invention of improvements in anchors, capstans, windlasses, and means of mooring and riding ships at anchor.—Sealed 8th February—6 months for inrolment.

To John Melville, of Upper Harley-street, in the county of Middlesex, gentleman, for improvements in the generation of steam, and on the application of steam or other power to navigation.—Sealed 8th February—6 months for inrolment.

To Jerome Deville, of Crutched-friars, in the city of London, coach-builder, for his invention of certain improvements in rail-roads, and in the carriages to be used thereon.—Sealed 8th February—6 months for inrolment.

To Robert Essex, of the parish of Saint Mary, Islington, in the county of Middlesex, silversmith, for his invention of certain improvements in the construction of paddle-wheels, and in the paddle-boxes or cases of steam vessels.—Sealed 8th February—6 months for inrolment.

To James Dutton, of Wotton-under-Edge, in the county of Gloucester, clothier, for his invention of certain improvements in the manufacture of woollen cloth, which improvements apply both to weaving and dressing of woollen cloth.—Sealed 8th February—6 months for inrolment.

To William Farquhar, of George-street, Tower-hill, in the precincts of the Tower of London, chronometer-maker, for his invention of improvements in generating steam for steam-engines.—Sealed 13th February—6 months for inrolment.

To John Ericsson, of Berkeley-street, Connaught-square, in the county of Middlesex, civil engineer, for his invention of an improved steam-engine.—Sealed 16th February—6 months for inrolment.

To Johann Gottlob Peyrig, late of Paris, in the kingdom of France, mechanician, now of Old Compton-street, Soho, in the county of Middlesex, for his invention of certain improvements in expressing or extracting liquids or moisture from woollen, cotton, and other

stuffs and substances, either in a manufactured or unmanufactured state.—Sealed 16th February—6 months for inrolment.

To John Jackson, of Kersley, in the county palatine of Lancaster, joiner and cabinet-maker, for his invention of certain improvements in sawing, planeing, tongueing, and grooving, and otherwise preparing or constructing window sashes, door and other frames, cornices, mouldings, and various other fittings or ornamental wood work, and in the machinery, tools, or apparatus to be used in the same.—Sealed 16th February—6 months for inrolment.

To Eugene Richard Ladislas de Breza, of Paris, in the kingdom of France, now of St. Martin's-street, Leicester-square, in the county of Middlesex, gentleman, for his invention of a chemical combination or compound for rendering cloth, wood, paper, and other substances indestructible by fire, and also preserving them from the ravages of insects.—Sealed 20th February—6 months for inrolment.

To Jeremiah Grime, of Bury, in the county of Lancaster, engraver, for his invention of certain improvements in manufacturing wheels, which are applicable to locomotive-engines, tenders, and carriages, and to running wheels for other useful purposes; also in the apparatus for constructing the same.—Sealed 21st February—6 months for inrolment.

To John Clay, of Cottingham, near Hull, in the county of York, merchant; Samuel Walker, of Millshaw, near Leeds, in the same county, cloth manufacturer; and Frederick Rosenborg, of Hull. in the same county, gentleman, for their invention of certain improvements in machinery or apparatus for shearing or cropping and dressing, and finishing woollen and other cloths.—Sealed 22d February—6 months for inrolment.

To Edward Holte, of Arundel-street, Strand, in the county of Middlesex, Esq., for his invention of improvements in making sugar from sugar-cane, and in refining sugar.—Sealed 24th February—6 months for inrolment.

To Moses Poole, of Old-square, Lincoln's Inn, in the county of Middlesex, gentleman, for his invention of improvements in preserving wine and other fermented liquids in bottles, being a communication from a foreigner residing abroad.—Sealed 24th February—6 months for inrolment.

To John Houlston, of Bradford, in the county of York, printer, for his invention of improvements in apparatus for stopping or retarding carriages.—Sealed 24th February—6 months for inrolment.

To Ambrose Ador, of Leicester-square, in the county of Middlesex, chemist, for his invention of certain improvements on lamps or apparatus for producing or affording light.—Sealed 24th February—6 months for inrolment.

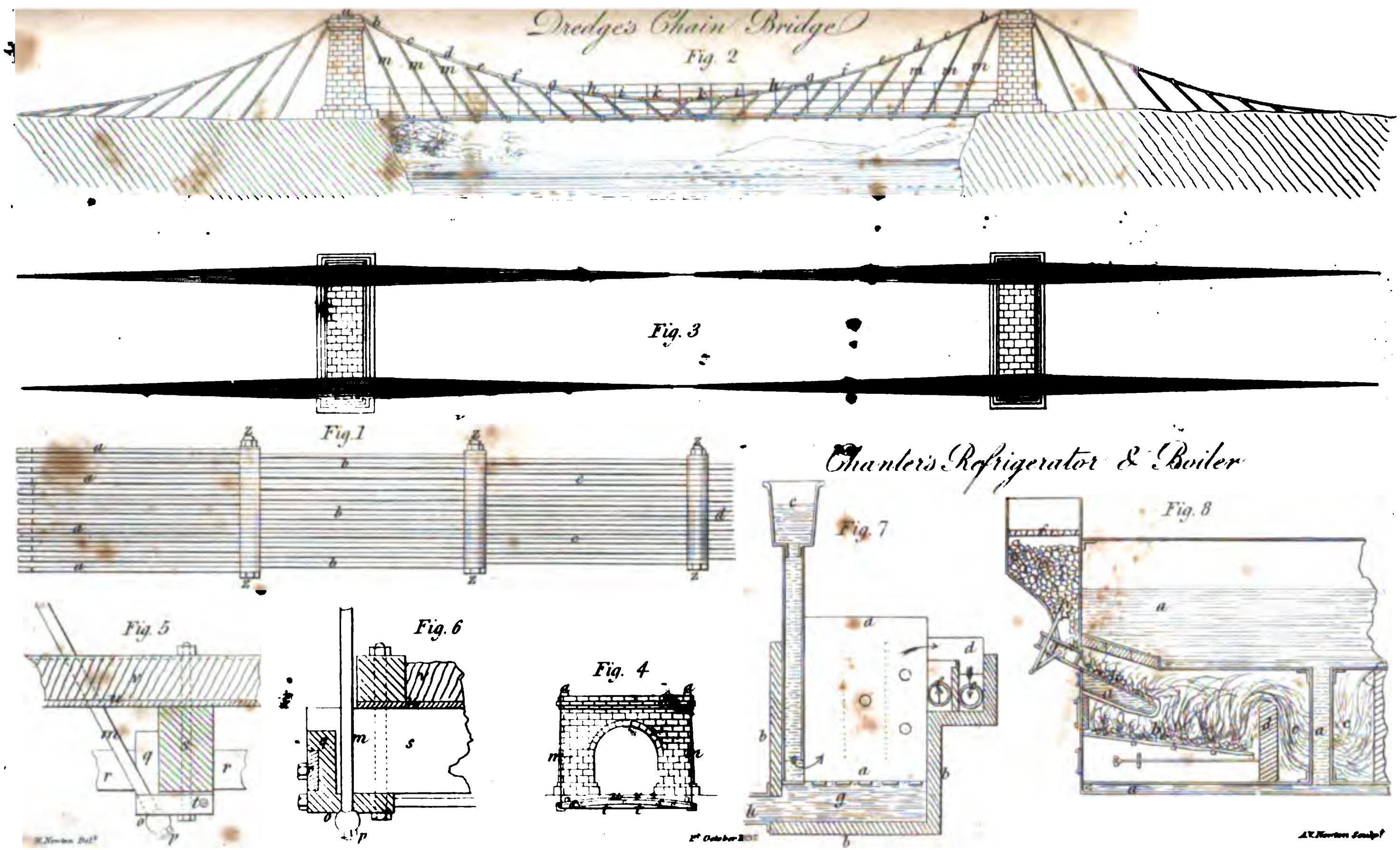
To John Thomas Betts, of Smithfield-bars, in the city of London, rectifyer, for improvements in the manufacture of gin, which he intends to denominate Betts's patent gin, or Betts's patent stomachic gin, being a communication from a foreigner residing abroad.—Sealed 24th February—6 months for inrolment.

To Michael Wheelwright Ivison, silk-spinner, residing in Hailes-street, Edinburgh, for his invention of an improved method of consuming smoke in furnaces other places where fire is used, and for economising fuel, and also for applying air, heated or cold, to blasting or smelting furnaces.—Sealed 24th February—6 months for inrolment.

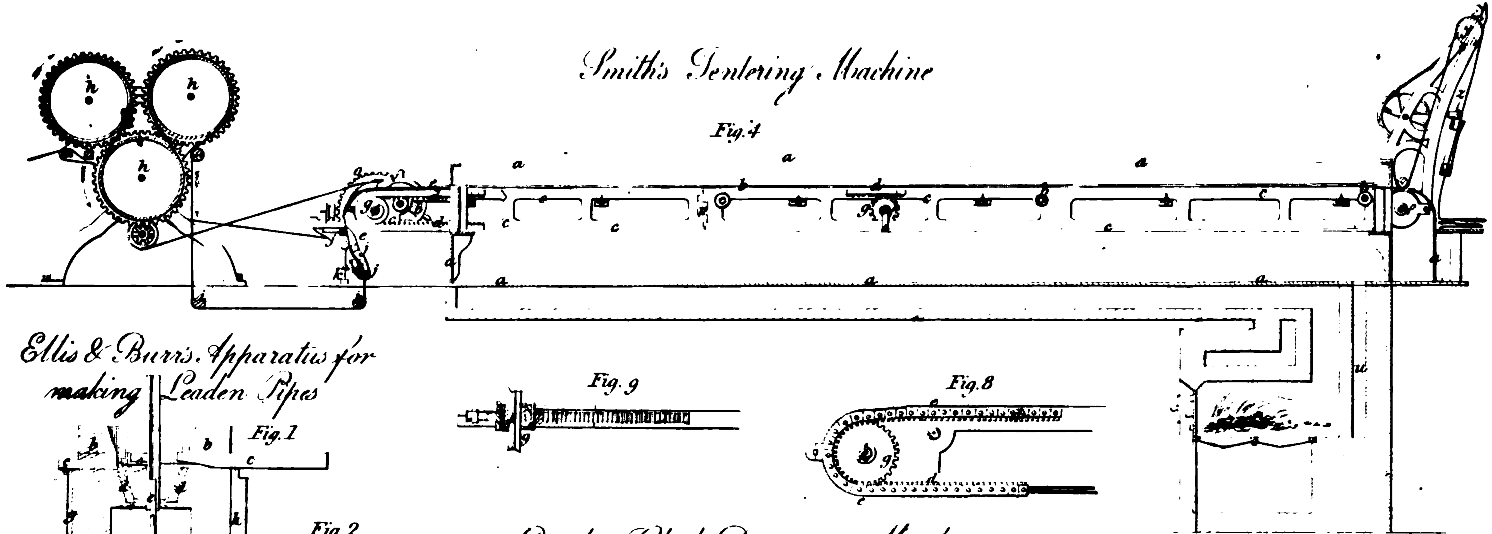
CELESTIAL PHENOMENA, FOR MARCH, 1838.

D.	H.	M.	
1			Clock before the sun, 12m. 39s.
	—		☽ rises 8h. 35m. M.
	—		☽ passes mer. 4h. 36m. A.
	—		☽ sets morn.
2	12	9	♃'s fourth satt. will im.
3	6	35	☽ in □ or first quarter.
	7	10	♀ in conj. with ♂ diff. of dec. 10. 36. N.
4	8	10	♃ in oppo to the ☉
	19	1	♀ in inf. conj. with the ☉
5			Clock before the sun, 11m. 48s.
	—		☽ rises 11h. 7m. M.
	—		☽ passes mer. 8h. 13m. A.
	—		☽ sets 4h. 28m. M.
	8	5	☿ greatest hel. lat. N.
	17	22	Ceres □ with the ☉
6	16	14	♃'s first satt. will em.
7	4	5	♀ in conj. with ♅ diff. of dec. 10. 16. N.
8	7	31	♃'s second satt. will em.
	10	42	♃'s first satt. will em.
	10	51	♄ stationary.
9	20		☽ in Apogee.
10			Clock before the sun, 10m. 33s.
	—		☽ rises 5h. 4m. A.
	—		☽ passes mer. 12h. 0m. A.
	—		☽ sets 6h. 29m. M.
	4	52	♃ in conj. with ☽ diff. of dec. 1. 19.
11	8	39	Ecliptic oppo. or ○ full moon.
	20	31	☿ in conj. with ♀ diff. of dec. 11. 27.
13	10	16	♃'s third satt. will em.
	12	12	☿ in conj. with ♅ diff. of dec. 1. 37.
15			Clock before the sun, 9m. 11s.
	—		☽ rises 11h. 4m. A.
	—		☽ passes mer. 2h. 40m. M.
	—		☽ sets 7h. 20m. M.
	10	7	♃'s second satt. will em.
	12	36	♃'s first satt. will em.
16	14	42	♄ in conj. with the ☽ diff. of dec. 6. 15.
17	7	5	♃'s first satt. will em.
	7	29	☿ greatest hel. lat. S.
18			Mer. R. A. 23h. 14m. dec. 7. 16. S.
	—		Ven. R. A. 22h. 26m. dec. 1. 45. S.
	—		Mars R. A. 23h. 35m. dec. 3. 44. S.
18			Vesta R. A. 1h. 28m. dec. 3. 53. N.
	—		Juno R. A. 18h. 2m. dec. 10. 9. S.
	—		Pallas R. A. 3h. 19m. dec. 10. 6. S.
	—		Ceres R. A. 5h. 7m. dec. 26. 35. N.
	—		Jupiter R. A. 10h. 56m. dec. 8. 22. N.
	—		Saturn R. A. 15h. 48m. dec. 17. 43. S.
	—		Georg. R. A. 22h. 45m. dec. 8. 41. S.
	—		Mercury passes mer. 23h. 34m.
	—		Venus passes mer. 22h. 39m.
	—		Mars passes mer. 23h. 51m.
	—		Jupiter passes mer. 11h. 12m.
	—		Saturn passes mer. 16h. 3m.
19	6	31	☽ in □ or last quarter.
	10	1	♃'s fourth satt. will em.
20			Clock before the sun, 7m. 42s.
	—		☽ rises 3h. 53m. M.
	—		☽ passes mer. 7h. 6m. M.
	—		☽ sets 10h. 23m. M.
	13	18	☉ enters Aries, Spring com.
	14	14	♃'s third satt. will em.
21	17	7	Juno in quad. with the ☉
22	12	44	♃'s second satt. will em.
	14	30	♃'s first satt. will em.
23	6	31	♀ in conj. with the ☽ diff. of dec. 10. 43.
	7	25	☿ in conj. with ♂ diff. of of dec. 0. 59.
	14	56	☿ stationary.
	16	41	♅ in conj. with the ☽ diff. of dec. 2. 25.
24	8	59	♃'s first satt. will em.
	13		☽ in Perigee.
	22	47	♂ in conj. with the ☽ diff. of dec. 0. 34.
25			Clock before the sun, 6m. 11s.
	—		☽ rises 5h. 56m. M.
	—		☽ passes mer. 11h. 47m. M.
	—		☽ sets 5h. 56m. M.
	—		☉ eclip. invisible.
	2	17	☿ in conj. with the ☽ diff. of dec. 0. 29.
	9	45	Ecliptic conj. or ○ new moon.
29	14	25	☿ in sup. conj. with the sun.
	15	20	♃'s second satt. will em.
31	10	58	♃'s first satt. will em.

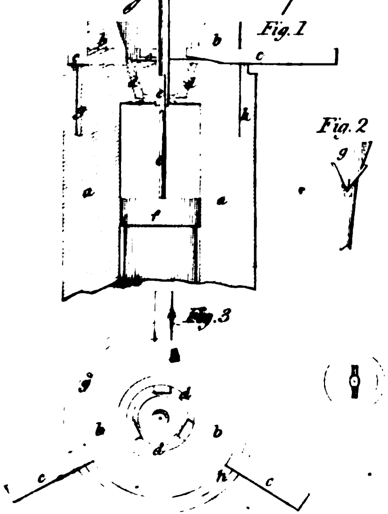
J. LEWTHWAITE, Rotherhithe.


Dredge's Chain Bridge
Fig. 2
Fig. 3
Fig. 1
Fig. 5
Fig. 6
Fig. 4
Chanter's Refrigerator & Boiler
Fig. 7
Fig. 8

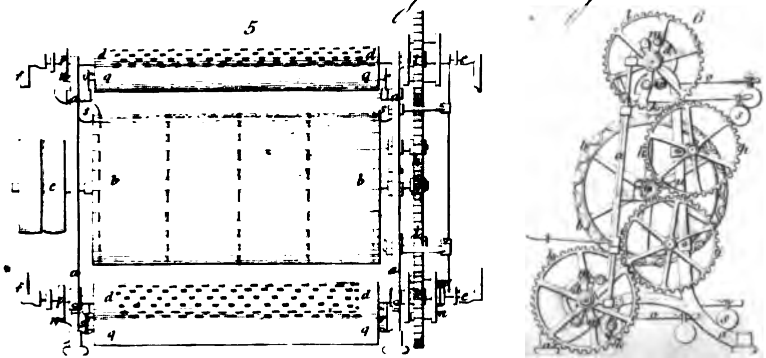
Smith's Tentering Machine

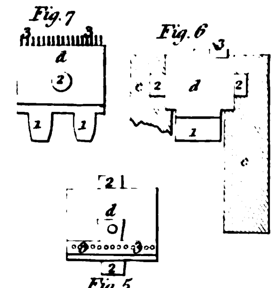


Ellis & Burr's Apparatus for making Leaden Pipes



Ritchie's Cloth Dressing Machinery





Bailey's Improved Stocking Frame

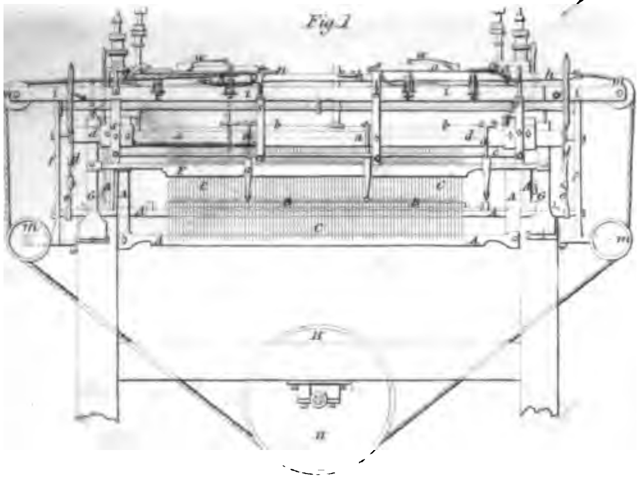


Fig. 1

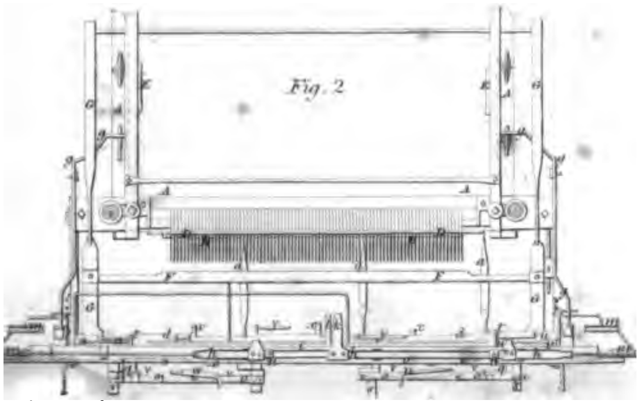


Fig. 2

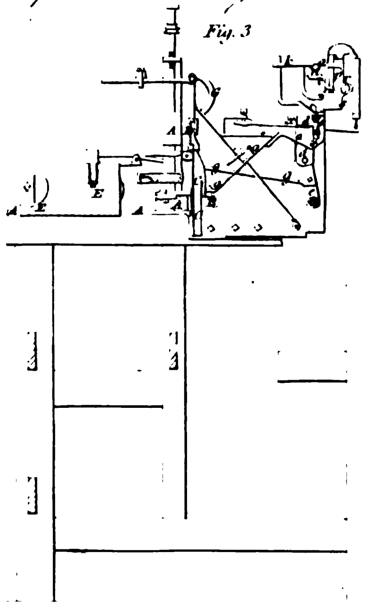


Fig. 3

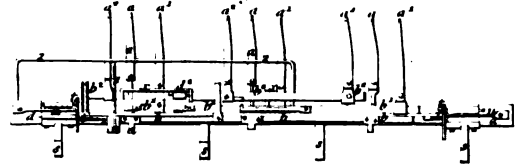


Fig. 5

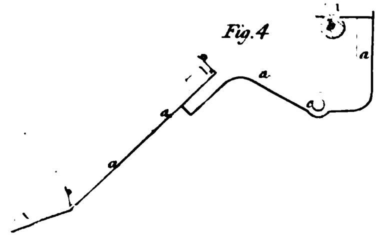
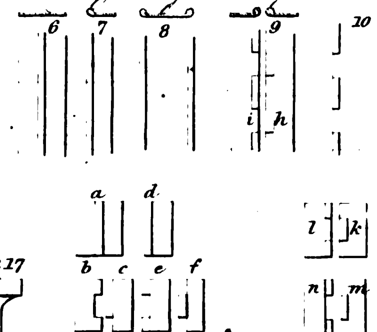
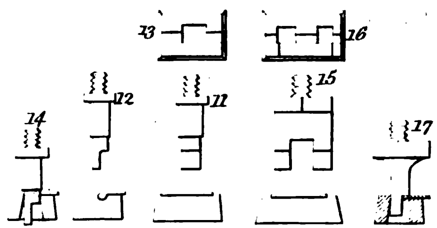


Fig. 4

Young's Hinges



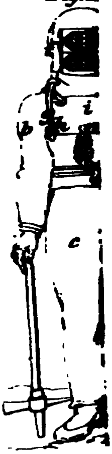


W. Newton Delt.

1st October 1837

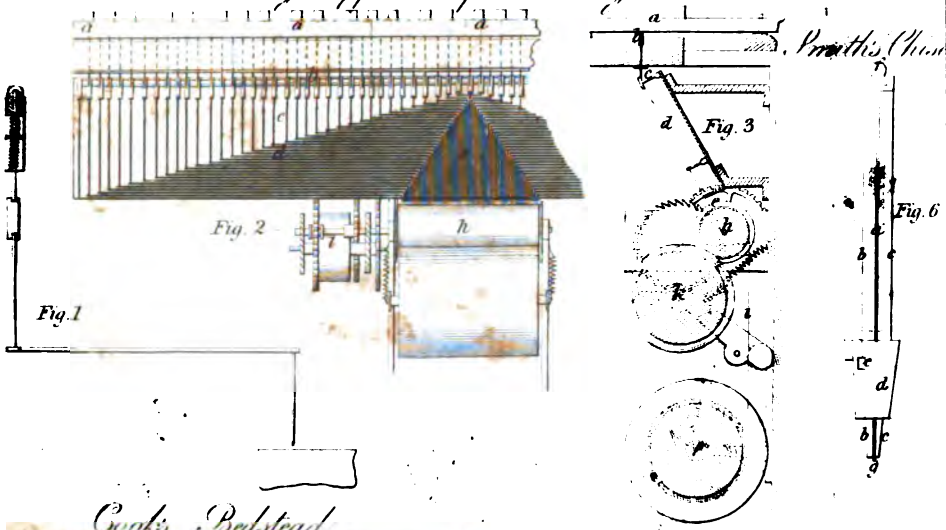
G. Winter Sculpt.

Fig. 1

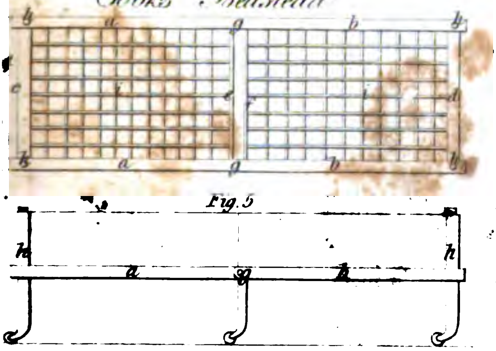


Berry's Apparatus for marking down notes

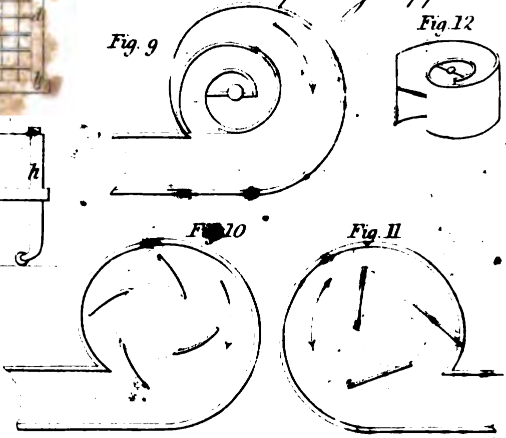
Smith's Chu[rn]



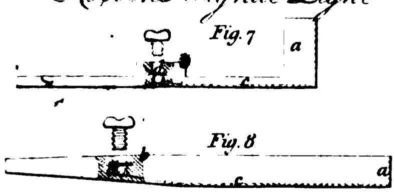
Cook's Bedstead



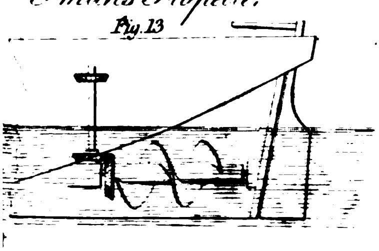
Hale's Propelling Apparatus



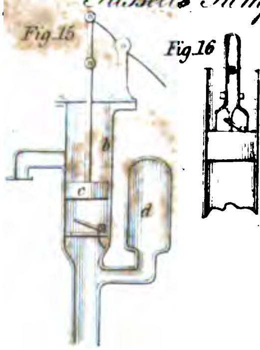
Robson's Signal Light



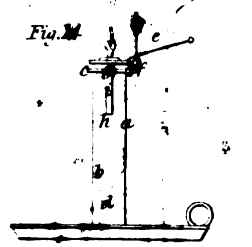
Smith's Propeller



Fussell's Pump



Walker's Extinguish[er]



Heathcoat's Impts in Weaving

Fig. 2 Fig. 1 Fig. 3

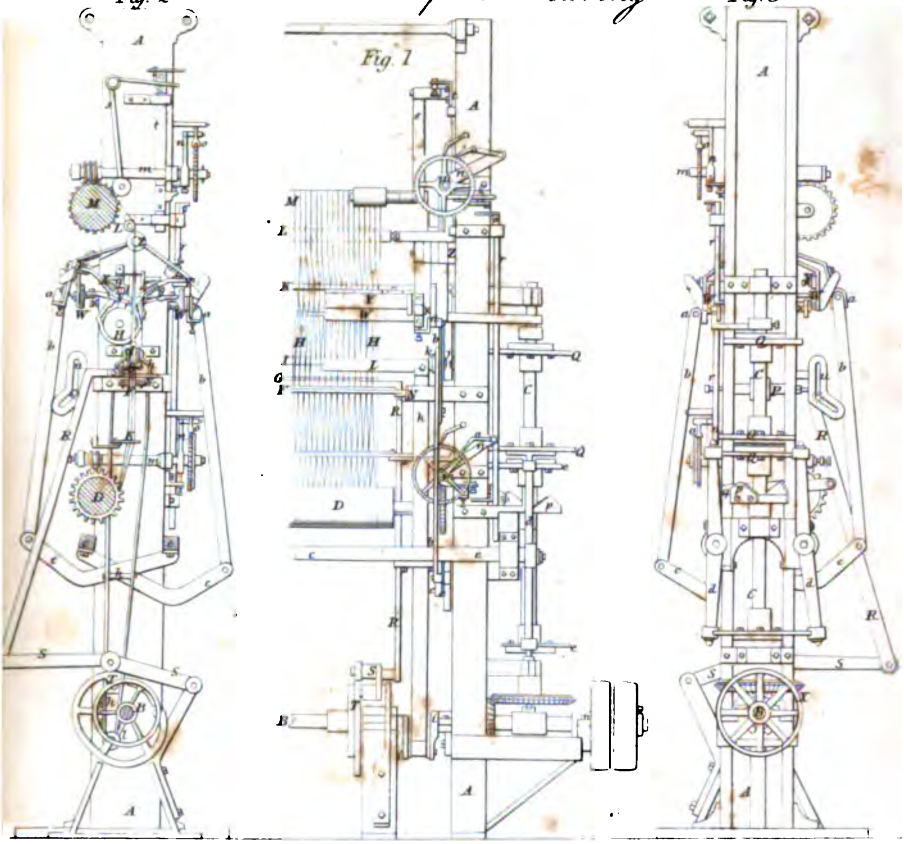


Fig. 10

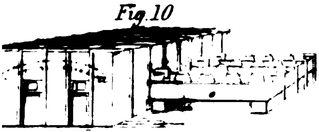
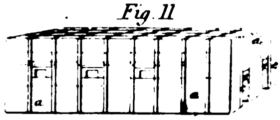


Fig. 11



Figs 4

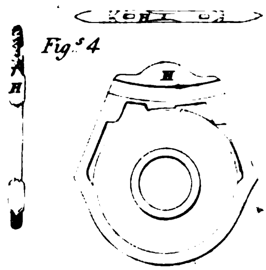
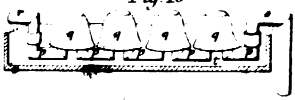


Fig. 16



Petwicke's Apparatus decomposing Salt

Fig. 12

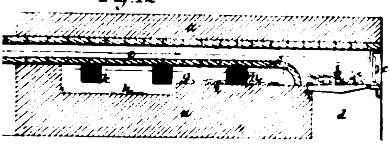
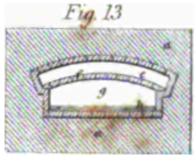
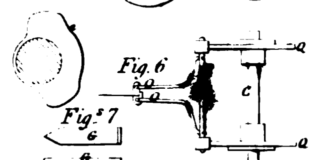


Fig. 13



Figs 8 Figs 9

Fig. 6



Figs 7

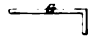


Fig. 14

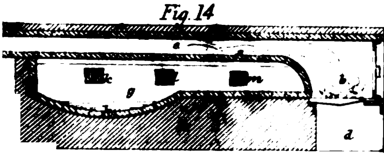
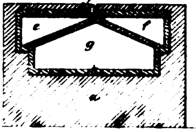
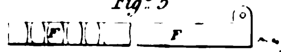


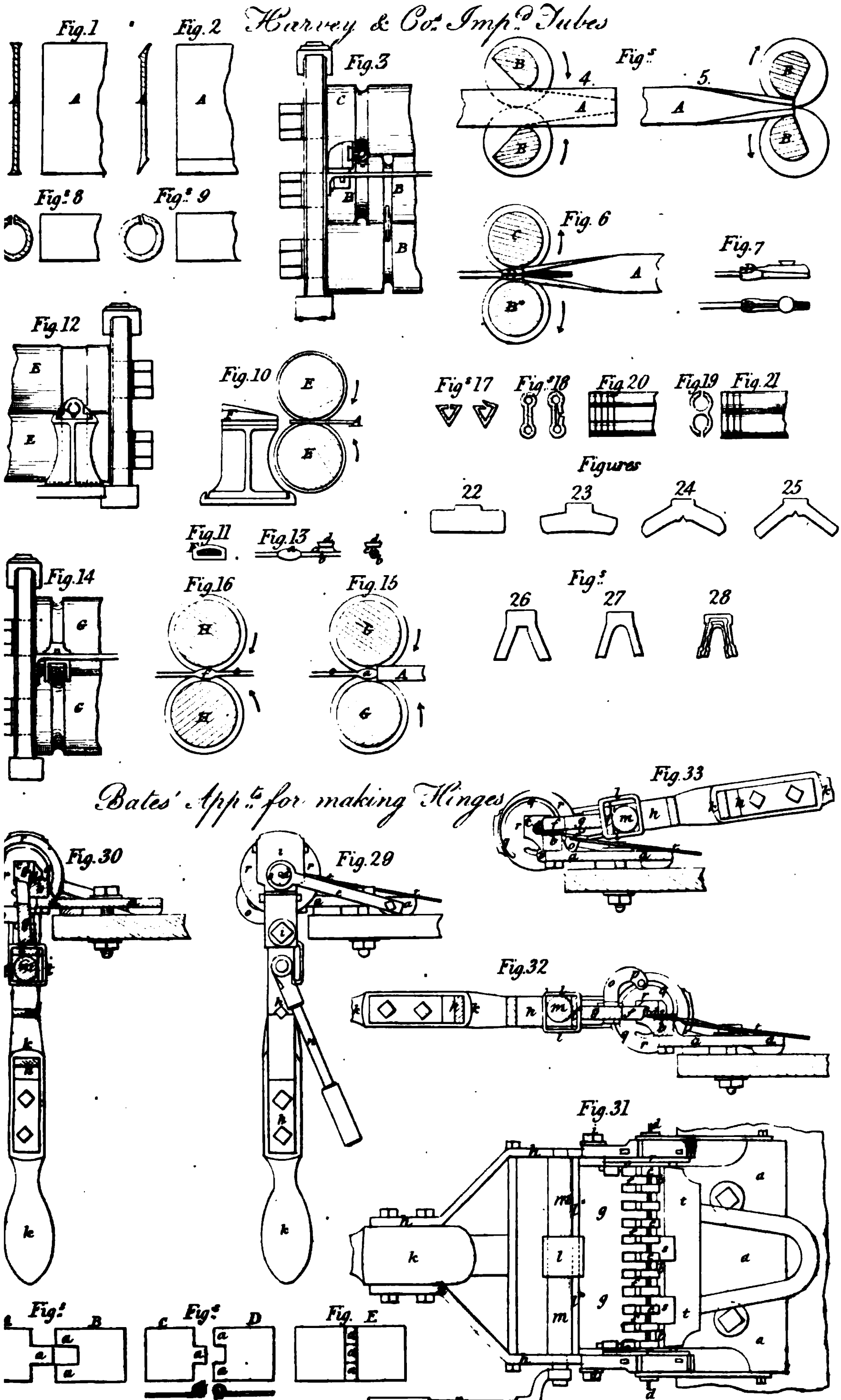
Fig. 15



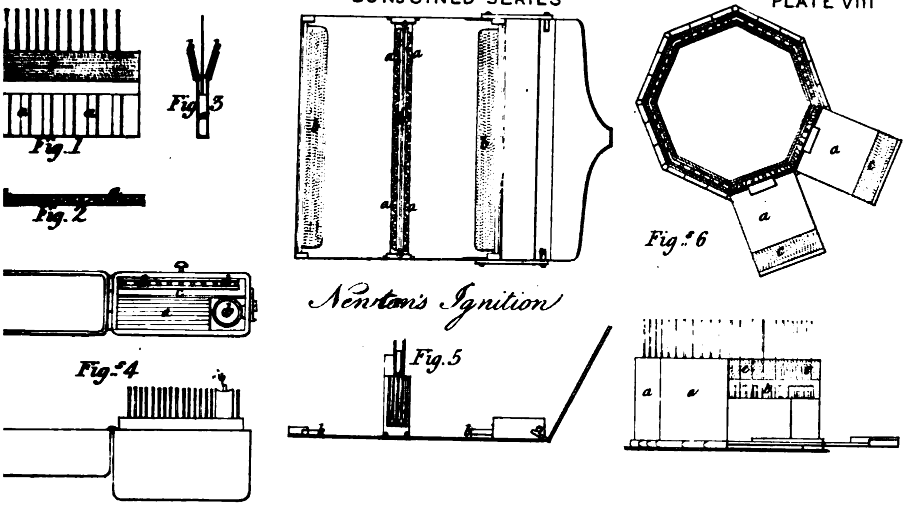
Figs 5



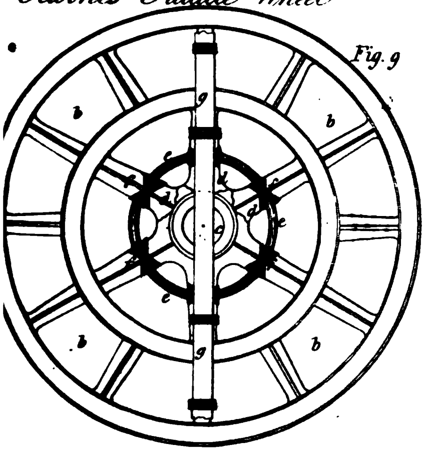
ren Del.

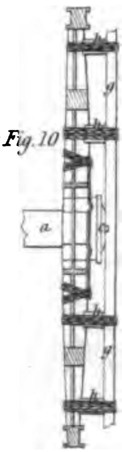

Harvey & Co.s Impd Tubes
Fig. 1
Fig. 2
Fig. 3
Figs. 4. 5.
Fig. 6
Fig. 7
Figs. 8
Figs. 9
Fig. 10
Fig. 11
Fig. 12
Fig. 13
Fig. 14
Fig. 15
Fig. 16
Figs. 17
Figs. 18
Fig. 19
Fig. 20
Fig. 21
Figures 22 23 24 25
Figs. 26 27 28
Bates' Appts for making Hinges
Fig. 29
Fig. 30
Fig. 31
Fig. 32
Fig. 33
Figs. B
Figs. D
Fig. E

Newton's Ignition



Pearne's Paddle Wheel





Adams' Wheel

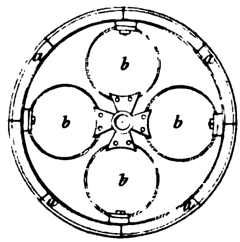
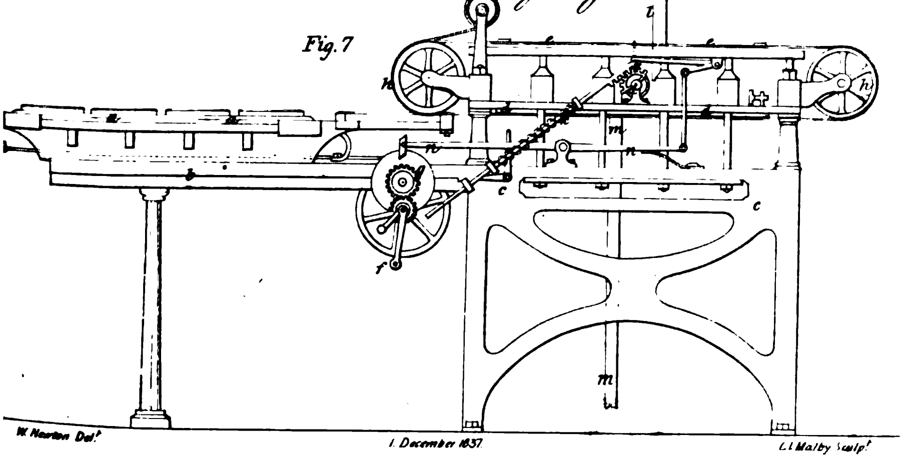


Fig. 8

Saxton's Printing Press

Fig. 7



W. Newton Del.t 1. December 1837. C.L. Malby Sculp.t

Gauntley's Lace Machinery

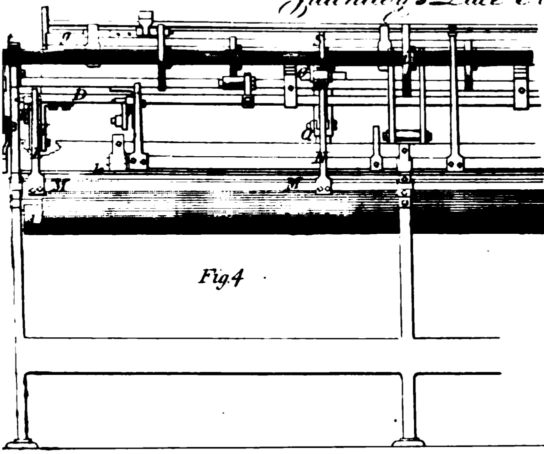


Fig. 4

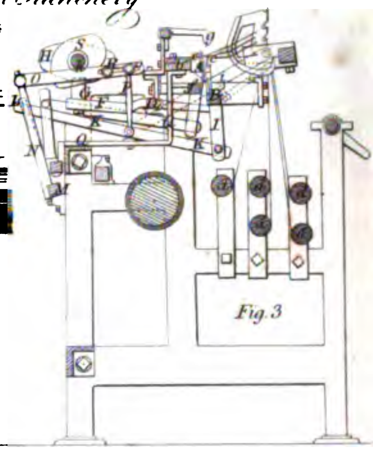


Fig. 3

Fig 5

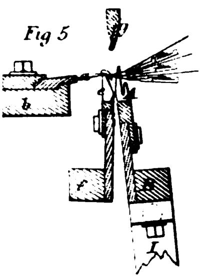
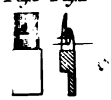


Fig. 1 Fig. 2



Rowland's Sextant

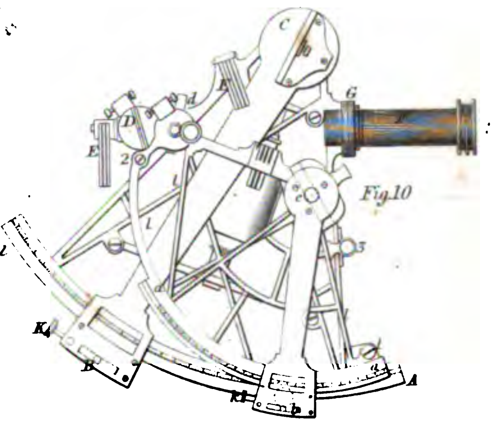


Fig. 10

Hawkins's Warming Pan

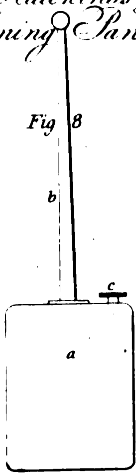


Fig 8

Fig 6

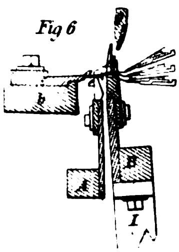


Fig. 11

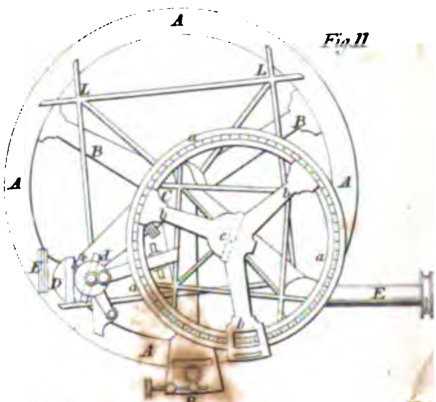


Fig. 7

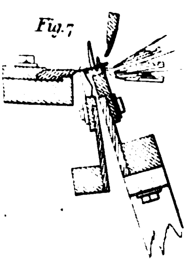


Fig. 9

Wheaton Del.t 1st Jan.y 1838 Bellin Sc.

Chanter & Gray's Impt. in Furnaces

Fig. 2

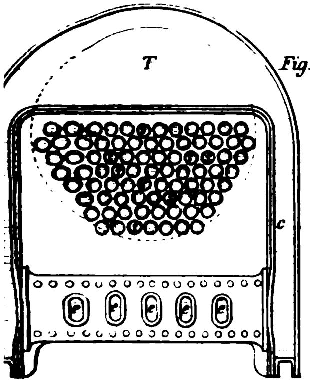


Fig. 1

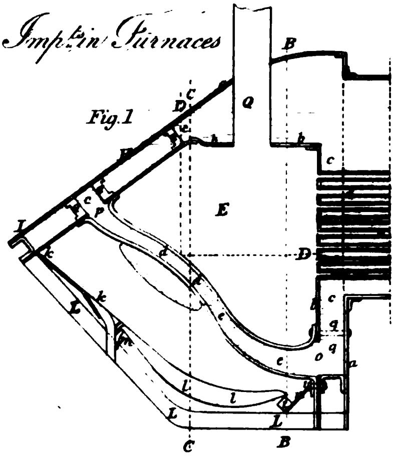


Fig. 3

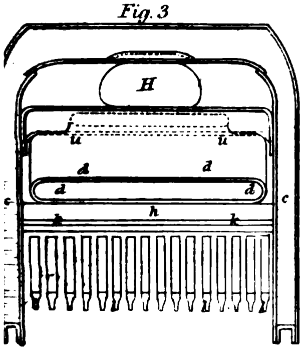


Fig. 4

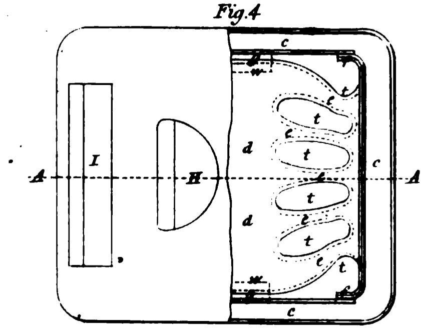
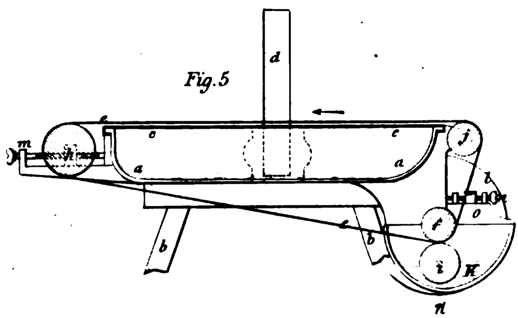


Fig. 5



Macnamara's Paving

Fig. 8

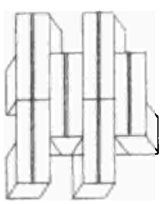
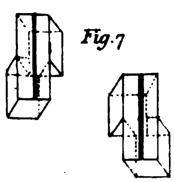
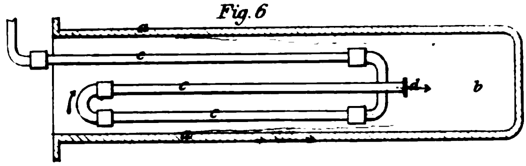


Fig. 7



Kirkham's Retort

Fig. 6



Berry's Improved Loom

Fig.1

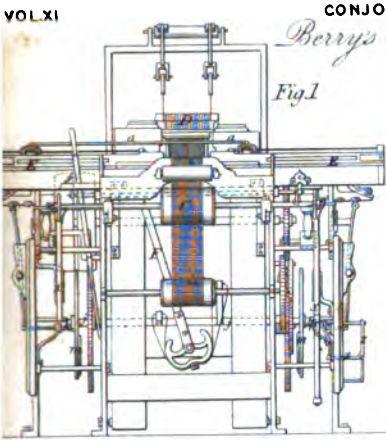


Fig.3

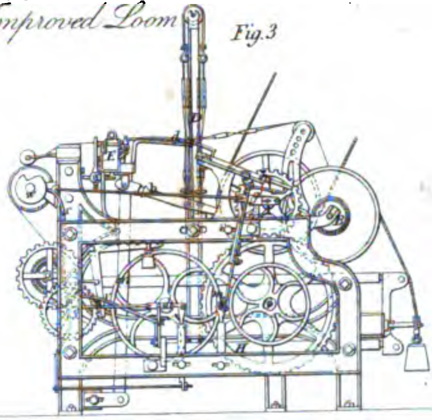


Fig.2

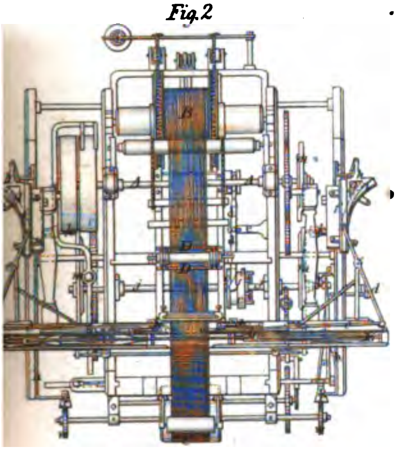


Fig.4

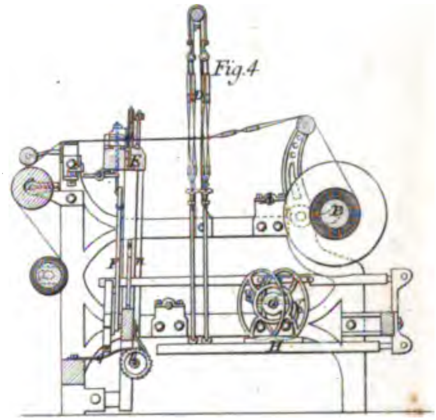


Fig.6

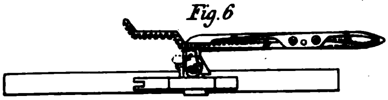
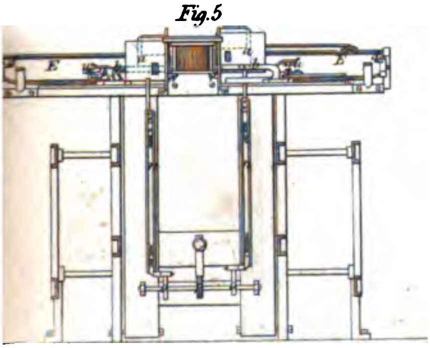
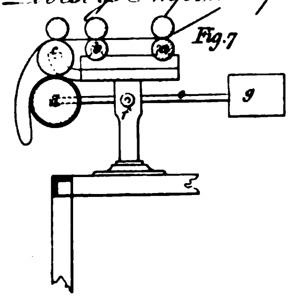


Fig.5



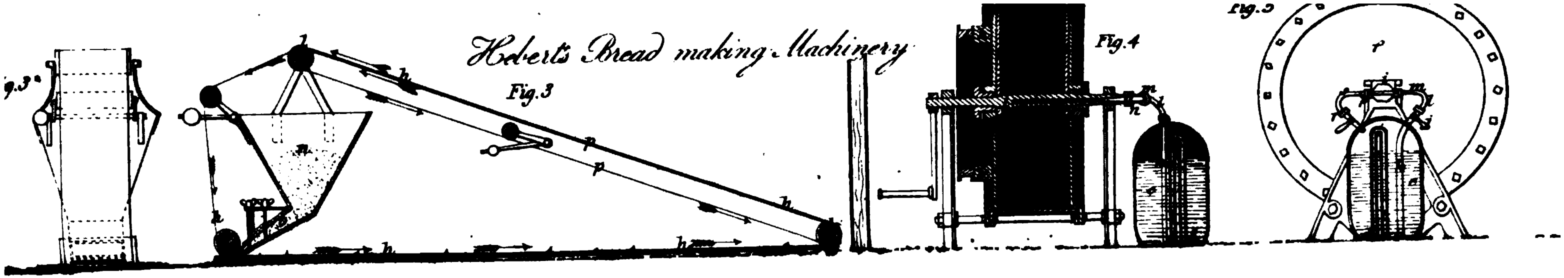
Livesey's Impt. in Spinning

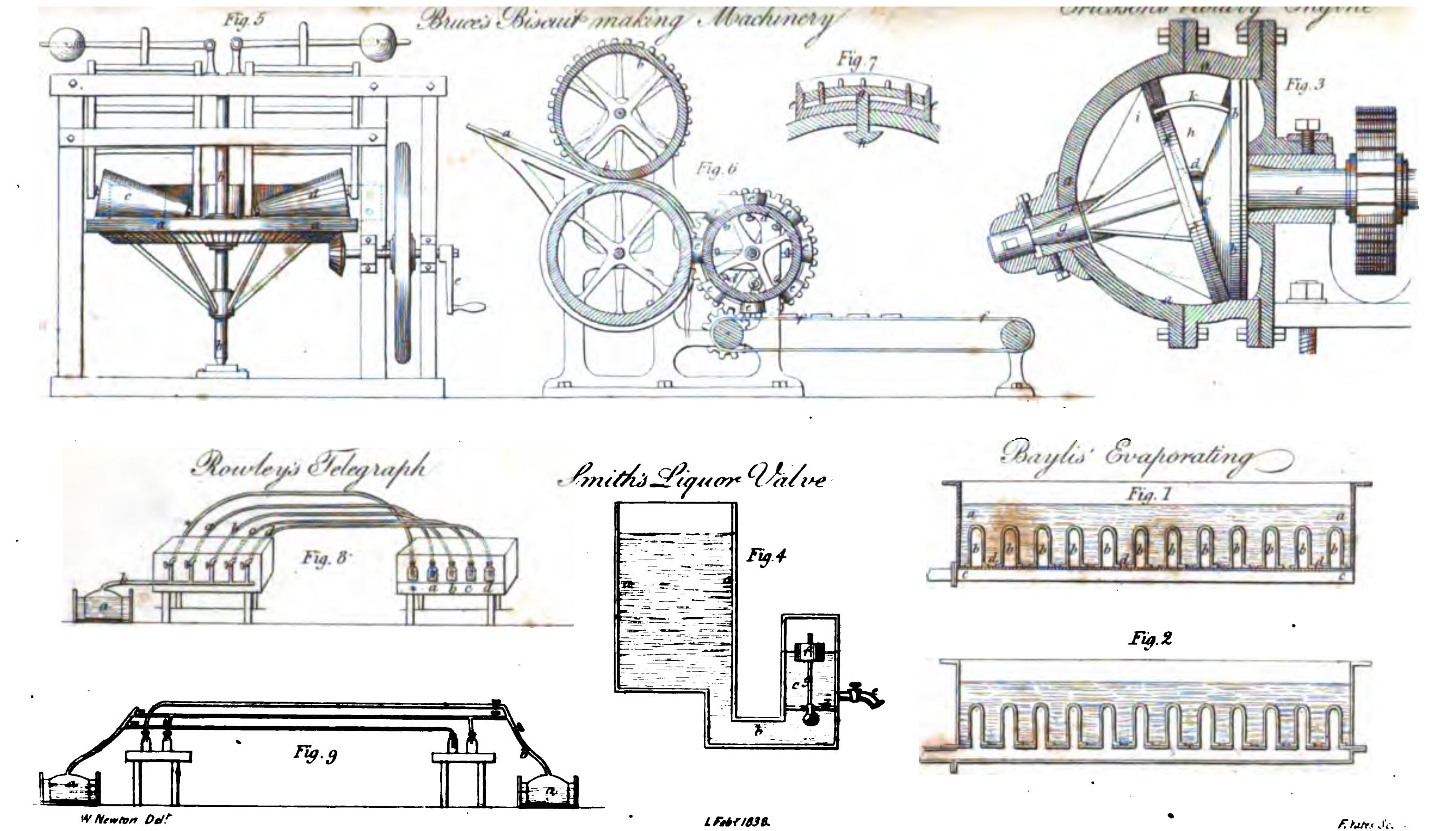
Fig.7



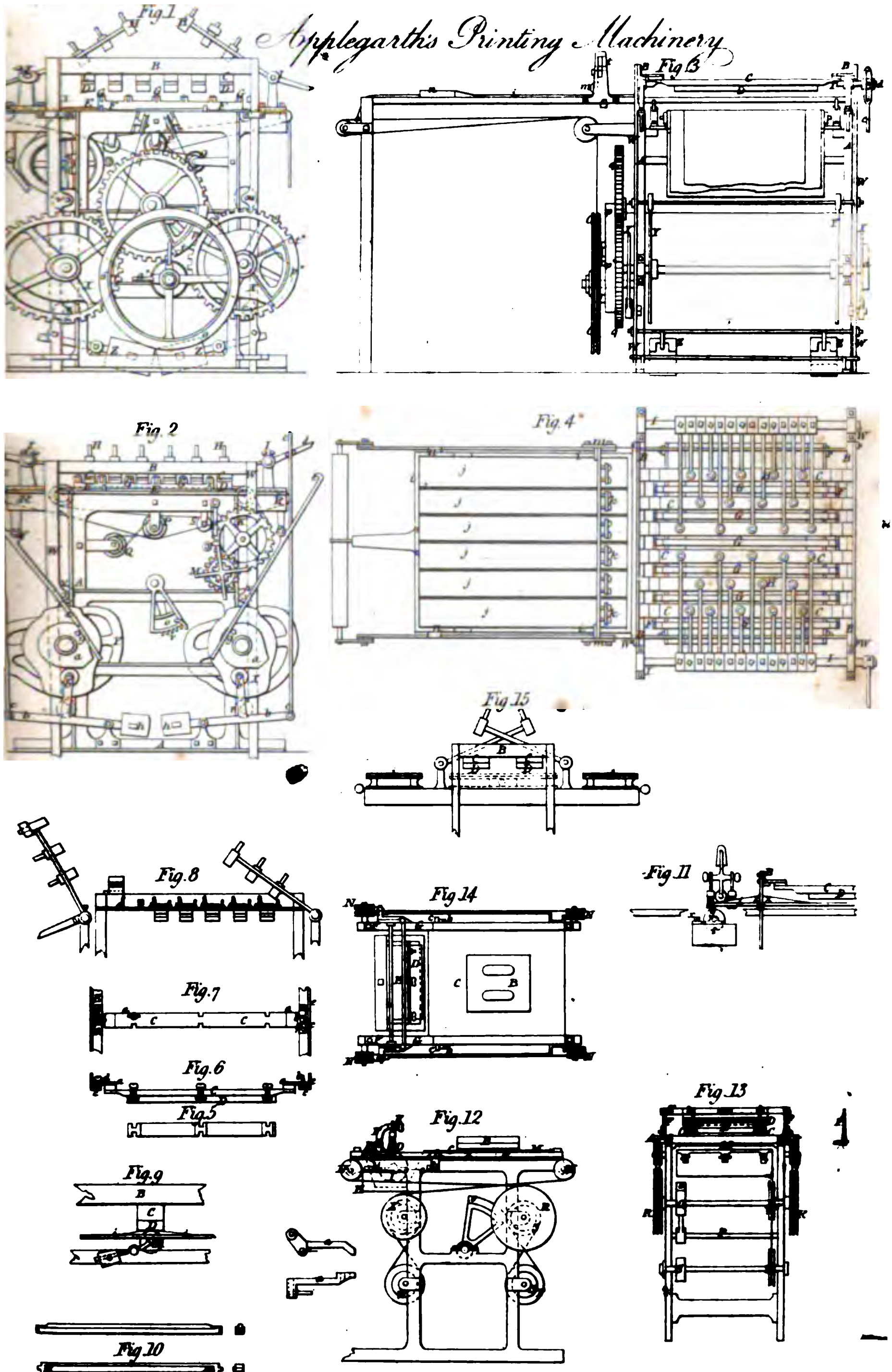
Newton Del. Feb.y 1st 1858 T. Sherratt Sc.

Hebert's Bread making Machinery

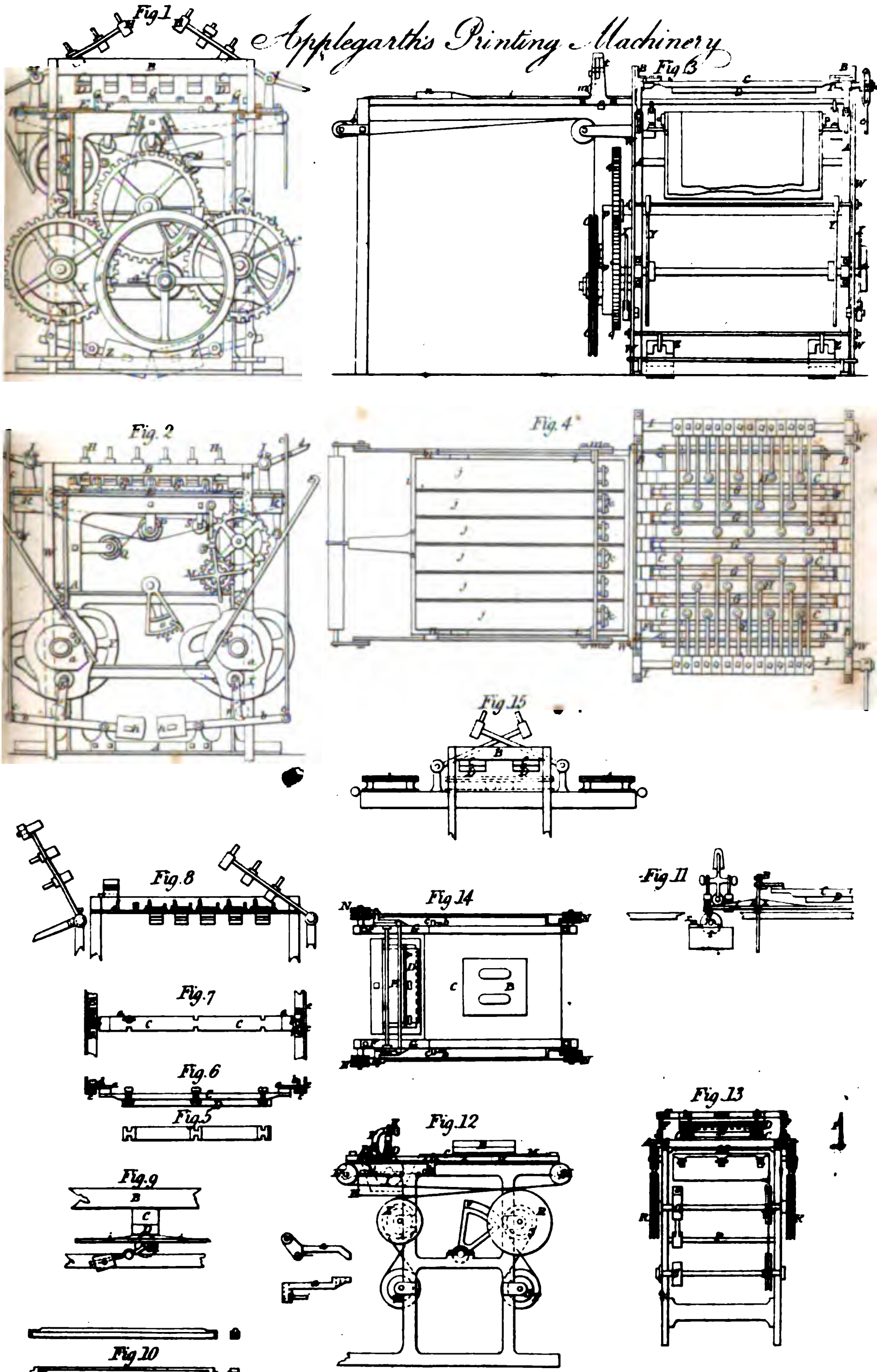



Bruce's Biscuit making Machinery
Fig. 5
Fig. 6
Fig. 7
Fig. 3
Rowley's Telegraph
Fig. 8
Fig. 9
Smith's Liquor Valve
Fig. 4
Baylis' Evaporating
Fig. 1
Fig. 2
W Newton Delt
1 Feby 1838.
F. Yates Sc.

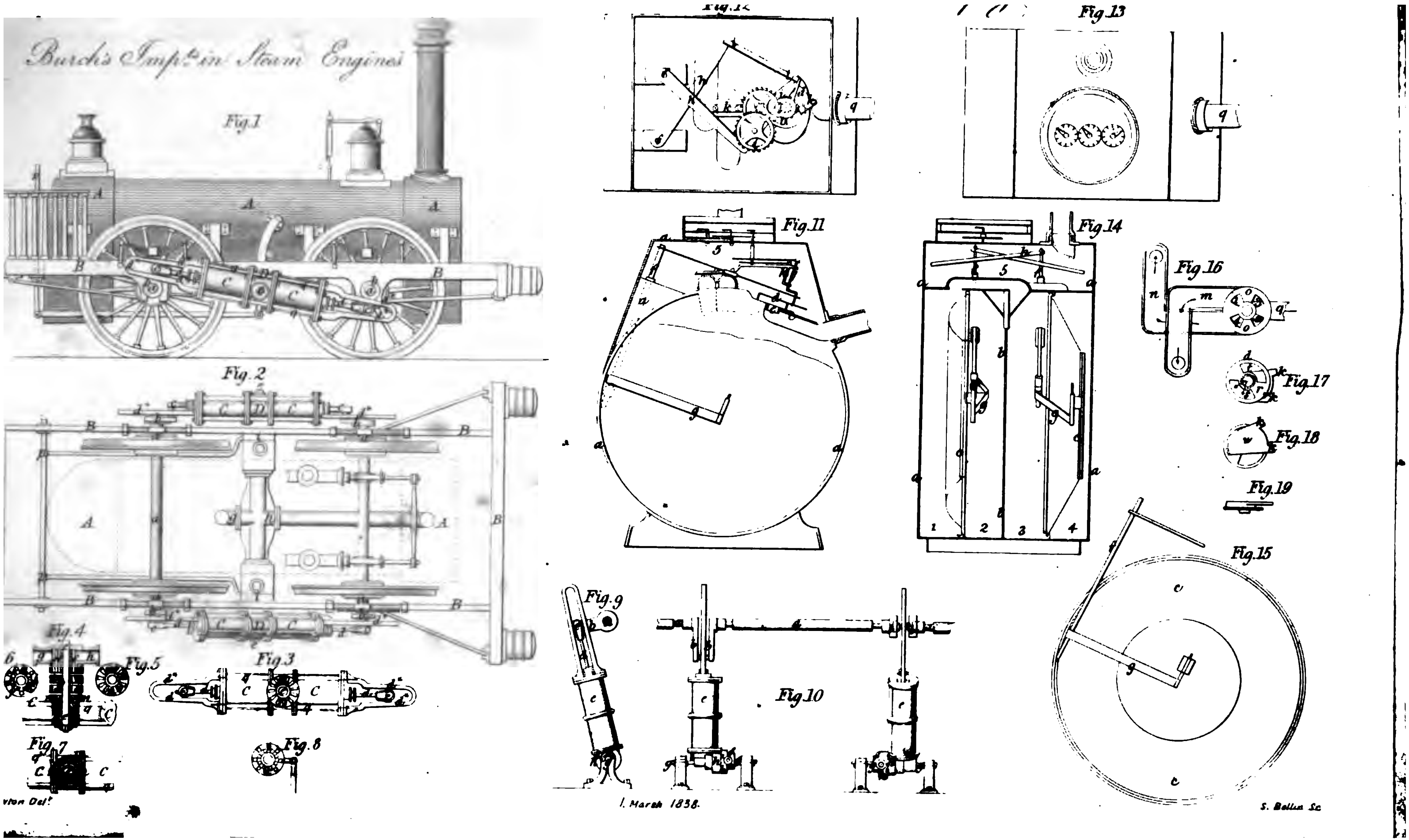
Applegarth's Printing Machinery



W. Newton Del.t 1st March 1838. T. Sherratt



W. Newton Del^t 1^st March 1838. T. Sherratt Sc.


Burch's Impts in Steam Engines
Fig.1
Fig.2
Fig.3
Fig.4
Fig.5
Fig.7
Fig.8
Fig.9
Fig.10
Fig.11
Fig.12
Fig.13
Fig.14
Fig.15
Fig.16
Fig.17
Fig.18
Fig.19
1. March 1838.
S. Bellin Sc
…vton Delt

Berry's Apparatus for Cleaning Grain